Products finishing

HOWARD CAMPBELL, Editorial Director
FRED W. VOGEL, Managing Editor

Volume 3 AUGUST, 1939 Number 11

Published monthly by
Gardner Publications, Inc.
431 Main St.
Cincinnati, Ohio

•

DON G. GARDNER
President and
General Manager

•

JOHN M. KRINGS
Advertising Manager

GEORGE E. HAY
431 Main St., Cincinnati
Main 0182

G. M. FILLMORE
JOHN VANDERVOORT
342 Madison Ave.,
New York
Murray Hill 6-3899

GEORGE H. MEYERS
Tribune Tower, Chicago
Superior 8329

Member

ECA

Copyrighted

CONTENTS

PRODUCTION FINISHING METHODS IN JOB SHOP 9
By George E. Monroe, Jr.

FINISHING BATHROOM HARDWARE 19
By J. J. Connors

HINTS FOR SUCCESSFUL SPRAY FINISHING 26
By R. K. Waterman

BARREL FINISHING OF METAL PRODUCTS, 36
By H. Leroy Beaver

THE FINISHING FORUM 42

NEWS OF THE INDUSTRY 46

NEW PLANT EQUIPMENT AND MATERIALS, 50

DID YOU KNOW THAT— 53

OPPORTUNITY SECTION 61

FOR YOUR CATALOG LIBRARY 62

INDEX TO ADVERTISEMENTS 64

More Than 14,750 Circulation This Issue

The answer to a question yet unasked...

"Necessity is the Mother of Invention" is today an antiquated relationship. Modern research is discovering the answers to literally hundreds of coating problems before the problems themselves have been discovered. The Stanley Laboratories may have developed a coating which will cut your finishing cost and improve the salability of your product. No manufacturer can AFFORD to overlook recent rapid developments in finishing science. An inquiry will bring you up to date — incurs no obligation. Address Department H —

THE STANLEY CHEMICAL CO.

EAST BERLIN CONNECTICUT

Lacquers · Enamels · Synthetics · Japans

A SUBSIDIARY OF THE STANLEY WORKS. NEW BRITAIN. CONN.

PRODUCTS finishing

CINCINNATI, OHIO VOL. 3, NO. 11

AUGUST, 1939

Production Finishing Methods in Job Shop

This article tells how the application of production finishing methods produced profits for a job shop.

By GEORGE E. MONROE, JR.

TWO years ago, Poray, Inc., Chicago, Ill., placed its finishing department on a production basis. An overhead conveyor system, an automatic 60 ft. baking oven, and a 500 gallon, 18 ft. enclosed conveyor type degreaser were installed. Not only did this new equipment increase the plant's production 75 per cent, largely through elimination of 80 per cent of handling of parts, but also paid for itself in several other ways.

Facing the necessity of large scale production in the finishing depart-

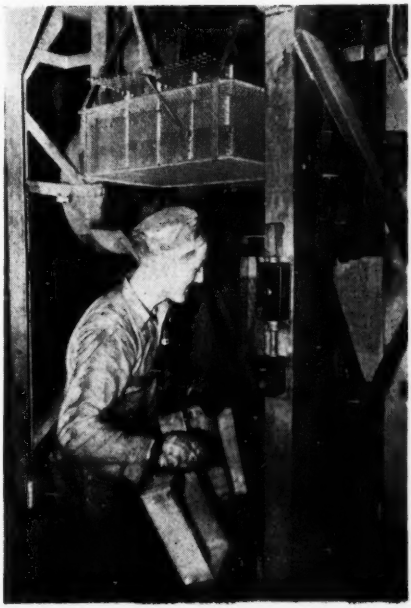


Fig. 1 — Operator unloading automatic conveyor type degreaser. The lower basket has just completed the degreasing cycle and the load in the upper basket is beginning the cleaning cycle.

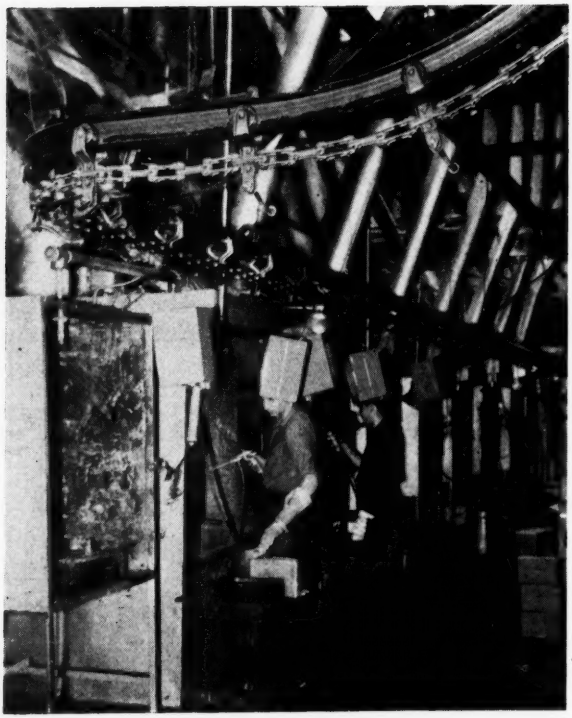


Fig. 2 — Illustration showing battery of 10 spray booths in which the wrinkle finishes are applied.

ment was not a new problem to President Walter Poranski. At one time he had owned a jobbing shop in New York City. Eight years ago he came to Chicago and started over again with a small shop, employing only five people, including himself. This business grew, until today it occupies two buildings.

In one two-story plant, there are 84,000 sq. ft. of floor space. In this plant, which is equipped with a complete tool works, stamps and dies for the manufacture of medallion plates, radio chassis, and various other small automobile accessories are made.

The new plant is a one-story structure enclosing 60,000 sq. ft. of floor space. The products manufactured in this plant and also products accepted on job contract from outside companies are finished in this building. The finishing operations include chrome, nickel, cadmium and silver plating, enameling, screen flocking, and wrinkle finishing.

Large orders for wrinkle finishes on metal radio cabinets created a demand for a stepped-up production. The 66 x 60 ft. department allotted for this finishing operation was crowded with trucks loaded with workpieces waiting to be finished and others were standing idle before a box-type oven which was too small to take the load. The congestion also usually created a shortage of trucks.

After the installation of the conveyor and automatic oven, the congestion completely vanished. The old box oven was turned over for the exclusive use of the enameling section and the wrinkle finishes were baked in the new oven.

The production finishing of radio cabinets starts with the automatic degreaser shown in Fig. 1. The workpieces are loaded in the baskets swung from the degreaser conveyor rods and are removed as soon as they return from the degreasing cycle. When the workpieces return from the degreasing cycle, they are placed on trucks and taken to the assembling

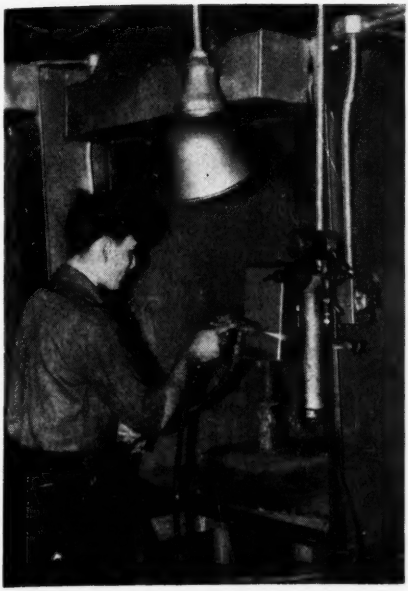


Fig. 3—Applying a synthetic finish to an automobile radio cabinet. The finish being sprayed on has been compounded specially to produce a wrinkle finish during bak.ng.

department. In this department, the parts to be finished are assembled with chrome plated filigrees and with speaker grilles from the flocking room.

As soon as the pieces are assembled, the holes which have been drilled through the metal cabinet are either masked from the inside to prevent paint from sifting into the interior or are masked with paper wads which are pushed through the holes on the outside. Masking in this manner prevents electric contact points on the inside from becoming coated with paint. After the masking operation, the cabinets are again placed on trucks and this time they are taken to the finishing department.

In the finishing department there are 10 individual finishing material spray booths as shown in Fig. 2. Each of these booths is used to apply a separate color. The operators of the spray booths work between their supply trucks which are conveniently located behind them and the spray booths in front.

Figure 3 shows a close-up view of an operator spraying a cabinet. As soon as the cabinet is finished, it is placed on the conveyor located directly above and carried to the oven. Although the 10 men at the finishing material spray booths may be placing cabinets on the overhead conveyor at the same time, only one operator is required to transfer them from the conveyor to the oven conveyor which carries them through

Fig. 4 — Transferring finished radio cabinets from the spray booth conveyor of the automatic oven to the assembly line conveyor.

the baking process. Fig. 4 shows an operator removing the cabinets from the spray booth conveyor and placing them on an oven conveyor. At the unloading end of the oven, the finished cabinets are transferred to another conveyor, which carries them to the packing and shipping tables. The operator shown in Fig. 5 is removing the finished cabinets from the oven conveyor and placing them on the overhead conveyor, which carries them to the packing and shipping tables. At the packing table shown in Fig. 6 the cabinets are examined very carefully before they are given a final okeh.

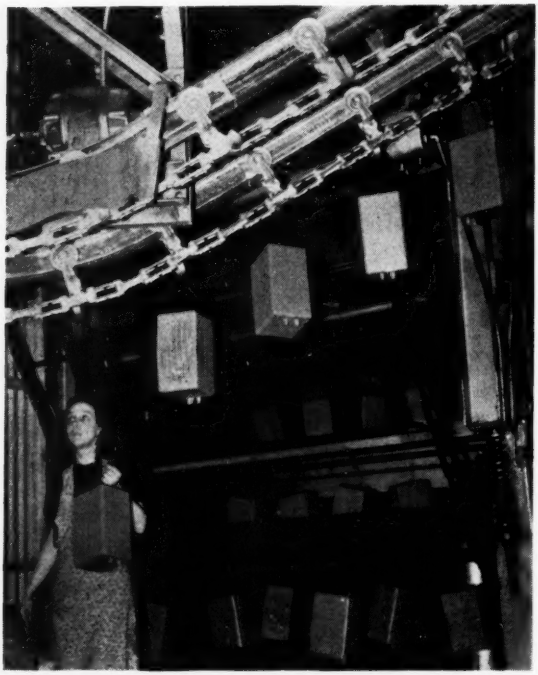


Fig. 5—Removing cabinets from the oven after baking and placing them on the conveyor which carries them to the inspection and packing department.

The installation of the new methods of handling the workpieces through this plant has reduced the cost of handling in 10 different ways. The progressive finishing department executive will recognize at once among the following 10 cost reducing ways the reasons why the initial cost of installing the new modern equipment soon pays for itself.

(1) At the finishing material spray booth it is not necessary to take up space with trucks and racks on which to hang freshly finished articles. This saving provides more space for more booths and more workmen.

(2) With a conveyor running along the line of finishing operators, the movement of the operator in handling the cabinets from rack-to-booth-to-spray-booth-to-overhead-conveyor are reduced to a minimum.

(3) There is no pushing of trucks through the aisles to the oven and there is no confusion caused by trucks being returned to the spray booths to receive freshly finished work.

(4) Because aisles can be kept free and open at all times, accidents have been almost eliminated.

(5) Supervision of the work is facilitated.

(6) A job is never spoiled by a truck being tipped over, thus reducing damage to the metal cabinets to a minimum.

(7) Work is never held up because the trucks are all loaded and waiting at the oven.

OVENS

Any Type, Size or Shape to Meet Any Industrial Requirement. Designed and Installed by Experts Backed by Years of Experience in Building Ovens for Every Purpose.

A large Mahon Tunnel Type Oven installed in the plant of the Studebaker Pacific Corp., Los Angeles, Calif.

THE R. C. MAHON COMPANY

DETROIT — — CHICAGO

Designers and Manufacturers of Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Hydro-Foam Dust Collectors, and Many Other Units of Special Production Equipment.

MAHON

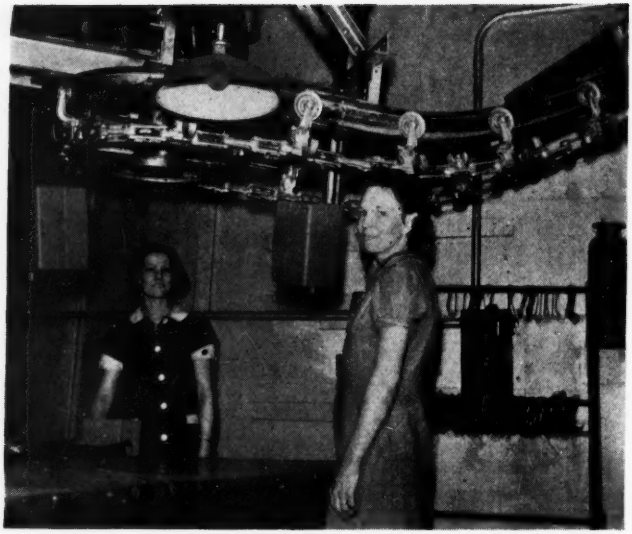


Fig. 6 — Illustration showing the manner in which the cabinets are removed from the conveyor and inspected before packing.

•

(8) Accidental burns have been eliminated. The baked cabinets delivered by the oven conveyor are not hot when the operators at the packing table receive them.

(9) The finished pieces are not touched by hand until they have been packed. Rejects from scarring have been reduced to one-half of one per cent.

(10) Eighty per cent of the handling has been eliminated. In the conveyor system, the major controlling factor has been the automatic oven. This unit is a specially built piece of equipment designed to handle a wide variety of work and types of finishes. Normally, the oven is geared to a one-hour cycle. At this rate, approximately 5,000 cabinets can be handled in an eight-hour day.

To increase the speed of production, the temperature of the oven can be raised and the reducing-agent-to-paint ratio changed. The oven may then be run on a one-half-hour cycle without affecting the quality of the finish while at the same time increas-

•

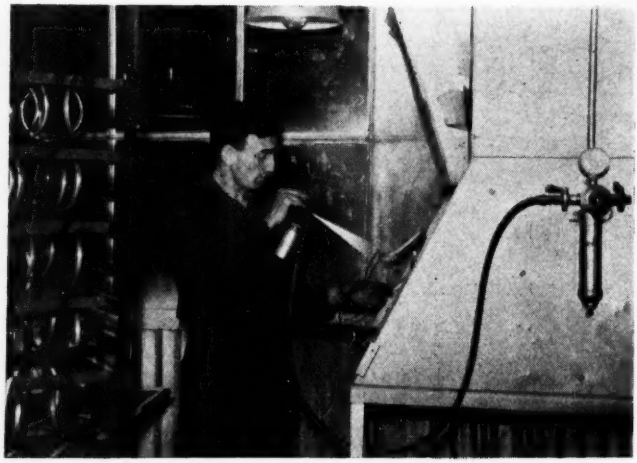


Fig. 7—An operator spraying a top coating of lacquer on a plated mirror frame in the air-conditioned enameling room. The exhaust system in this room carries away fumes and dust completely.

ing the production to 7,500 pieces in an eight-hour period.

When operating on the one-hour cycle, the oven temperature is held at 250 deg. F. and by means of automatic temperature controlling instruments there is never more than a three degree variation. The ratio of the reducing-agent-to-paint when the one-hour cycle is used is about one to five. On the one-half-hour cycle, when the temperature is stepped to a maximum of 320 deg. F. or a minimum of 290 deg. F., the reducing-agent-to-paint is about one and one-half to five.

While finishing material formulas compounded specifically for the oven prevent its speed from being altered without considering other controlling factors, the capacity of the oven controls the production from the conveyor system.

Even though the new automatic baking oven has a temperature range from 250 to 500 deg. F., which is high enough for enamel baking, the old 24-truck box oven is used for this purpose, since the work is handled on a different basis. For enameling, an air-conditioned 20 x 30 ft. room has been partitioned off in the finishing department. The room temperature is held at 70 deg. F. with no more than a five degree variation at any time. The relative humidity is regulated at 50 per cent. Forced draft ventilation is used throughout and at each of the six double spray booths in this department, the fumes are drawn off by fans which are located in each spray booth.

ALL RUBBER GLOVES ARE *NOT* ALIKE

★ For example—Miller Acid and Industrial Gloves are made by the Anode process by which "live" rubber, containing all of its original strength, is deposited direct from Latex in a single dip.

Actual tests show that Miller Anode Gloves of regular weight are equivalent to ordinary rubber gloves of extra heavy thickness in resistance to tearing and snagging. Many other advantages such as uniformity of thickness, extreme flexibility, and high aging qualities are also made possible by the Anode process.

Miller offers a complete line of Anode Acid and Industrial Gloves with wrist-length rolled cuffs or 5″ and 9″ gauntlets in a complete range of thicknesses. Place a trial order and put them to the test. You will quickly see the economy of using Anode gloves. Write us for name of your nearest jobber.

MILLER RUBBER CO., Inc., Akron, Ohio

"Engineers in Rubber"

Inasmuch as the room is air conditioned, the operators in the enamel finishing department are not required to wear masks. The air that is breathed is never in contact with the toxic fumes from the sprayed finishes. The air conditioning also protects the surfaces of the enameled workpieces. The slightest amount of dust would spoil the finish, but in the air-conditioned room the dust is drawn off before it has a chance to come in contact with the work.

In order to protect the enamel finish, a top coat of lacquer is applied to the workpieces. Fig. 7 shows an operator spraying a top coating of lacquer on a plated mirror frame. The lacquer dries faster than the enamel and although the workpiece is not dry enough to handle, the chrome highlight trim on the mirror frame can be wiped free of spray mist. Small pieces such as automobile dashboard medallion plates are also handled in the enamel room.

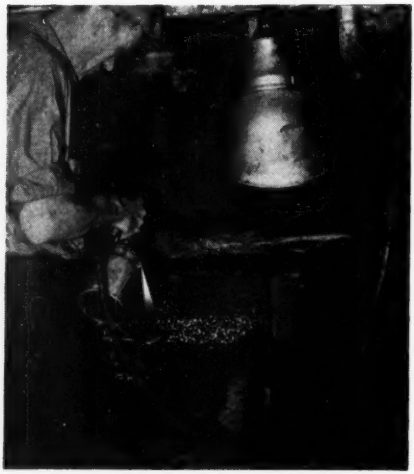


Fig. 8—The spray operator shown in this illustration can be seen applying a sizing varnish on a grille which will then be coated with rayon flock.

Fig. 9—Rayon flock coatings are applied to radio grilles by the operator shown in this illustration.

Parts such as this may be given several coats, depending upon the finish desired. White, brown, black, and various shades of metallic finishes are the colors generally used. While the grille flocking operations do not take place in the finishing department, the application of color varnishes is an important part of the work here. When the grilles to be flocked are brought to the finishing plant they are first coated with a sizing varnish by the operator shown in Fig. 8. The booth shown in this illustration is located in an 8 x 10 ft. room which has been set aside for this work. Within three minutes after the grille has been sprayed with the varnish, it must be sprayed with dry flock of the same color as the varnish. The flock consists of finely ground rayon.

The operator shown in Fig. 9 can be seen spraying the flock to a workpiece. The flock is applied by means of an air gun and is sprayed on the work until it looks like a sample of carpeting. After the rayon flock and

varnish have thoroughly dried, the excess flock is blown off with an air spray. The grille is then ready to be assembled in the radio cabinet.

"Dustube" Dust Collector. Complete information on American Assembled Type "Dustube" Dust Collectors is now available in a new illustrated circular recently published by The American Foundry Equipment Co., 557 S. Byrkit St., Mishawaka, Ind. The mechanical features and the construction of this collector are clearly explained in the circular by means of drawings and illustrations. Specifications on all available models are completely listed.

The assembled type "Dustube" Collector incorporates the same basic principles of design as the large knockdown type Dustube Dust Collector. The assembled type is recommended where relatively small volumes of air are to be handled.

The American Assembled Type "Dustube" Collectors are said to be ideally suited for the collection of dust created by sand blasting, tumbling, Wheelabrating, grinding, and similar processes.

Copy free upon request.

Aluminox Abrasive and Polishing Grains and Flours. A very interesting 14-page catalog describing "American" Abrasive Grains is now being published by American Emery Wheel Works, Richmond Square, Providence, R. I. The two types of American Abrasive Grains described in this catalog are Carbolite and Aluminox.

Both abrasives are widely known for their use in grinding wheels; Carbolite wheels are used on materials of low tensile strength, and Aluminox on materials of high tensile strength. Carbolite grain is also often used in abrasive paper and cloth, and in abrasive discs. Adhesives and setting-up methods, tables of grain selection, and suggestions for special treatment of abrasives are subjects which are also included in this catalog.

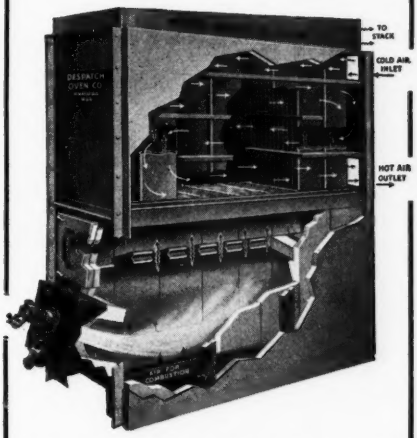
A copy of "Aluminox Abrasive and Polishing Grains and Flours" will be sent free upon request.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

ANNOUNCING

THE NEW

DESPATCH

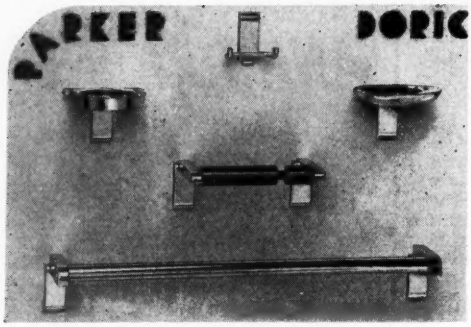


INDIRECT AIR HEATER

This New Despatch Gas or Oil Fired Indirect Air Heater will amaze you with its superior performance...with a new freedom from maintenance and shutdown worries...with its remarkably longer life . . . with its greater operating savings!

WRITE TODAY for interesting illustrated bulletin on the many new features of the New Despatch Indirect Air Heater.

DESPATCH OVEN CO.
622 S. E. Ninth
Minneapolis Minnesota



Finishing Ba

Modernization of athro have both auth

Charl

FOR many years, the American public has given little thought to an important part of its home—the bathroom. It was only after continued efforts on the part of leading bathroom accessory manufacturers, including The Charles Parker Company, that the public was made conscious of the fact that the bathroom was something to be proud of and not ignored.

In order to attain success in leadership in the field of bathroom hardware manufacture, it has been necessary to produce plated parts which not only have a distinctive and eye-appealing style but also a quality and permanent finish that will stand up under the changing atmosphere of the bathroom. It has also been necessary to market the accessories at a price low enough to allow the average home owner to purchase them. The Charles Parker Company has kept up with the latest developments in finishing and the science of reducing costs while maintaining a high standard of quality. The following article describes the finishing processes now employed at the Meriden, Conn., plant of The Charles Parker Company.

The bathroom hardware manufactured in this plant is either cast, forged, or die cast of bronze and brass, thus it is readily noted that various types of polishing wheels for the first finishing operation are necessary. The castings come into the polishing department shown in Fig. 1 and are started on a No. 70 abrasive wheel followed by a No. 120 and then by a No. 180. The forgings and die castings are polished in this department by means of a No. 180 abrasive felt wheel. On the polishing operations, the workmen are provided with special chucks that enable them to handle the workpieces with the fewest possible motions. Ingenuity has been shown in this department by the development of wheels shaped to fit items such as soap holders, tumbler holders, and other peculiarly constructed articles of the bathroom hardware line.

Following the polishing operation the parts are taken to the buffing department, a view of which is shown in Fig. 2. In this department, as in the polishing department, special holding chucks are used to hold the workpieces during the buffing operation. There are nine double spindle buffing lathes used with buffs 12 to 14 in. in diameter which provide a maximum surface speed of

Bathroom Hardware

throoms requires accessories that
autiful and durable finishes.

By J. J. CONNORS

Charles Parker Company, Meriden, Conn.

8,500 ft. per minute.

Considerable savings have been effected in the buffing department by the use of Airway Ventilated Buffs manufactured by the Jackson Buff Corporation. This type of buff prevents the burning up of wheels and has cut the consumption of tripoli in half. After the tripoli finishing operation, the workpieces are placed in trays and placed in the two-phase Detroit Rex degreasing unit shown in Fig. 3. The parts are placed in this machine to remove accumulations of grease or buffing compound. The unit shown in the illustration has two chambers filled with trichlorethylene. In one of these, the solution is boiling which creates a vapor above the chambers. A cold water jacket located around the outside of the tank condenses the vapor, thus confining it to the machine and conserving the solvent.

In the degreasing operation the parts are placed in the boiling chamber where a large portion of the tripoli is removed. Complete removal of the tripoli is assured in the second chamber containing the solvent vapors. The vapor portion of the degreasing unit through which the parts finally pass leaves the parts dry and free from grease.

After degreasing, the work is given a second buffing or as it is termed, coloring. A high, lustrous color is obtained on the workpieces by buffing them with a very high grade of lime compound which also leaves the parts chemically clean. This operation eliminates entirely the task of removing specks of compound which is often necessary after other buffing operations.

The bathroom hardware is now ready for the plating department but before it is permitted to be taken into this department it is very carefully inspected for quality of base metal, machining, soldering and buffing, and cleaning. Any parts that do not measure up to the requirements and specifications maintained

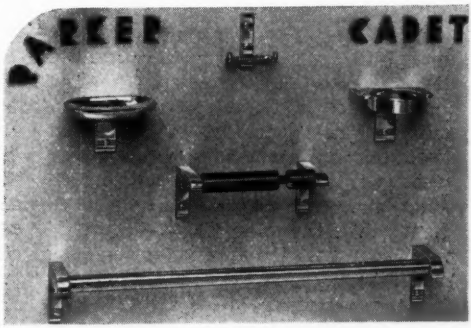


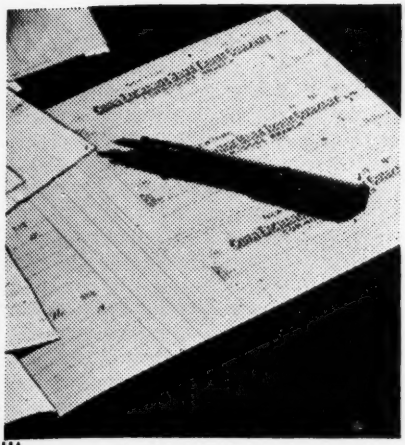
Fig. 1—A view of the polishing department where cast, forged, and die cast bathroom accessories are polished prior to buffing.

by this company are immediately rejected and returned to the department responsible for the rejection.

The work that passes the inspection is racked for nickel plating in the department shown in Fig. 4. The first operation of the plating sequence is an alkaline cleaning bath made up of three ounces per gallon and operated at a temperature of 145 deg. F. The racked workpieces are made the cathode for one minute and anode for 15 seconds. The low temperature of the cleaning solution enables the operator to do hand swabbing on certain parts of large areas without the danger of oxidation. An interesting point here is that while the cleaner would probably last for three or four weeks before being contaminated enough to cause trouble, it is replaced every week. This precaution not only avoids blistered rejects but assures a permanent bonded chromium plate for the ultimate purchaser of the bathroom accessory.

A hot water rinse follows the electrocleaning and then the workpieces are passed into a second alkaline cleaner which assures a perfect chemically clean surface which is an initial requirement of successful bright nickel and chrome plating. Two rinses are next, followed by a sodium cyanide dip. Following this dip, the pieces are again passed through two water rinses.

Even though many rinses are present in the cleaning cycle, there is always danger that the pores in the metal contain trapped alkali and cyanide which the rinses have failed to remove. Consequently, a sulphuric



Concerning THE CHECKS YOU WRITE For *Protective Coatings*

OF COURSE, you're interested in those cost items that cover the insulation of your plating racks and the masking of parts which are to be hard chromium plated. In using Miccro Supreme Stop-Off Lacquers, you will not only find exceptionally effective coatings but you will realize savings that are almost unbelievable when compared to the use of other protective materials.

The initial cost of Miccro Supreme Stop-Off Lacquers is low. They are applied *directly on the metal surface* with no treatment necessary other than cleaning the surface to be coated. There is no expense for tape or special treatment. When used for insulating plating racks, very little lacquer is required for each rack. If a rack should become damaged in process, it is only necessary to touch up the damaged section—the lacquer patch becoming an integral part of the entire coating... saving time and eliminating the former trouble and expense of factory repairing.

Be sure that you are fully acquainted with *all* of the money-saving advantages of these lacquers. Complete information is yours for the asking.

Watch for the New "Miccro" Development To Be Announced Soon.

Miccro Supreme

STOP-OFF LACQUERS

Developed and Manufactured By Experienced Platers

MICHIGAN CHROME COMPANY

6342 East Jefferson Avenue • Detroit, Michigan

acid dip made up of 20 per cent strength and used with a current of six volts is next used. Lead anodes are employed and the workpieces are electrolyzed thoroughly for one minute, thus removing any foreign elements. Even though the sulphuric acid is of high concentration and current is also used, the bright buffed finish of the workpieces does not become dull. Both the sulphuric acid and cyanide solutions used in the finishing sequence are replaced monthly. Two cold water rinses follow the sulphuric acid dip and are then ready for bright nickel plating.

The bright nickel bath is contained in the 475 gallon capacity large rubber-lined tank which can be seen at the far end of the plating department illustrated in Fig. 4. This solution is the Pyrene patented bright nickel and operates at a temperature of 130 degrees F. The nickel is applied to the bathroom hardware at 20 to 25 amperes per square foot to a required thickness of 0.00025 inch. Articles such as soap and tumbler holders which are subject to considerable wear in the recessed portions are plated to a minimum thickness of 0.00025 inch.

At regular intervals, workpieces are removed from the production line to make certain that the required thickness is being maintained. The bright nickel bath is checked and analyzed every 24 hours and additions to the solution are made when necessary.

In the finishing of bathroom hardware, many advantages of the bright nickel over the gray nickel have been found. The same thickness of plate is applied in one-fifth the time required in the gray nickel bath and

Fig. 2—Cool-operating Airway Ventilated Buffs are used in this buffing department to obtain beautiful buffed finishes at high speeds.

Fig. 3—The Detrex degreaser shown here is a two-phase unit used for removing tripoli buffing compound.

the bright nickel plate is more closely grained. When the solution is operating at maximum efficiency, the plate obtained does not require buffing before chrome plating. An additional cleaning operation after nickel buffing is also eliminated.

After the parts have been removed from the bright nickel solution, they are transferred to the chromium plating department shown in Fig. 5. In this department, the parts are placed in the chromium plating solution on the same racks that were used in the nickel plating department. An automatic temperature control of the chromium plating bath to within five degrees provides one of the means for obtaining maximum throwing power of this solution. A thickness of 0.00002 in. of chromium is required and periodic tests are made to check this thickness.

Another advantage of the bright

New, Safer Way to Discharge Plating Acids and Chemicals!

T.P.C. SAFETY SIPHON

• This efficient, inexpensive device provides smooth, controlled flow of acids and chemicals, without danger of splashing or spilling. It produces a regulated flow from a trickle to 6 gallons per minute. Reduces hazards of burns and fumes. No manual tilting of carboys. Works on vacuum principle, eliminating the pressure method condemned by the M. C. A. Sturdily built. 4 types for all acids. Put a T. P. C. Safety Siphon on test. State type of acid or chemical, and container, when ordering. Detailed literature and prices on request.

PULMOSAN SAFETY EQUIPMENT CORP.

Dept. PF, 176 Johnson St., Brooklyn, N. Y.

ALSO . . . Carboy Truck and Tilter, Respirators, Goggles, Aprons, Gloves, Hoods, Skin Protective Creams, Pails and Dippers. Write for leaflet "Safe Handling of Acids and Chemicals."

Fig. 4—The convenient location of tanks required for the sequence of operations in bright nickel plating in the department shown here reduces handling time to a minimum.

nickel plating solution is that the nickel plated parts can be moved directly from this bath into the chromium plating bath. This is made possible because this type of nickel plating bath does not require acti-

Fig. 5—A view of the chromium plating department. The workpieces are chromium plated on the same racks that are used in the nickel plating operation.

vating before chrome plating.

After chrome plating, the workpieces are transferred to the inspection department. The combination nickel-chrome plating racks are passed through a special cleaning cycle before being used for nickel plating again. The cycle consists of stripping the chrome off in a hydrochloric acid bath, followed by two water rinses, a bright dip, an alkaline cleaner, and two more rinses. This removes any chromic acid that may be clinging to the roughened surfaces of the racks. Experience has shown that approximately 12 cc. of chromic acid in 300 gallons of cleaner will cause blistering of the nickel plate.

After inspection of the chromium plate, the parts are assembled when necessary and sent to the packing room, ready for service in American bathrooms.

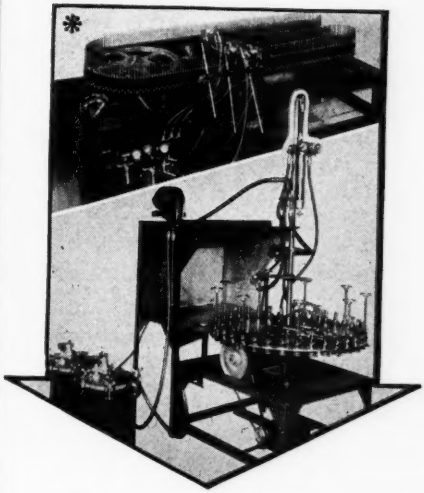
Hewitt Magazine. The Hewitt Rubber Corporation, Purmort and Patterson Aves., Buffalo, N. Y., manufacturers of industrial hose, conveyor and transmission belting, and molded products, has recently joined the ranks of those companies publishing house organs with its first issue of the "Hewitt Magazine." Outstanding in its first or Spring issue is a complete listing, by name, of all Hewitt employees.

In introducing the new magazine, Thomas Robins, Jr., president, states: "It is singularly fitting that at this time, the 80th anniversary of the birth of Hewitt Products, that we present the initial issue of the 'Hewitt Magazine.'" The magazine has 16 pages, a self-containing cover, and is printed on 80-pound white enamel stock. The covers are in two colors and the first issue contains two regular Hewitt advertisements.

The "Hewitt Magazine" will be issued four times a year with an entirely new format for each issue.

Copy free upon request.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.



Save time

on

FINISHING OPERATIONS

with SPRACO automatic finishing

If you want to speed up production, save materials, and improve finishes, better look into Spraco automatic finishing equipment. For Spraco automatic machines cover a wide range of requirements — finish machine parts, utensils, partial assemblies, shell work, novelties, containers, etc. . . . Simple controls, precision spray guns, pressure feed containers, spray booths, and all necessary equipment built into Spraco machines insure dependable operation and consistently high quality finishes.

Send us a brief outline of your requirements and let us submit recommendations and cost estimates. It will cost you nothing, and may make possible substantial cuts in your production costs.

**Two Spraco automatic finishing machines illustrate the simplicity and sound design of the equipment.*

SPRAY ENGINEERING CO.

120 CENTRAL ST. SOMERVILLE, MASS.

Hints for Successful Spray Finishing

By R. K. WATERMAN

Decorative Advisory Service, Roxalin Flexible Lacquer Company, Elizabeth, N. J.

ONE of the greatest evils of finishing, and one which is constantly overlooked, is the improper management of the spray room and the inadequate maintenance of equipment. Greatly increased production and the elimination of excessive rejects can be accomplished by efficient organization and the application of correct spray equipment technique. The purpose of this article, therefore, is to explain the procedure necessary to eliminate most of the common finishing problems.

As a lacquer manufacturer's service man, the writer of this article is faced with more problems than any other one individual. Some of these problems, together with their solutions, are discussed here.

Choice of Operators

Choice of suitable spray operators is of prime importance. Since finishing is the final operation and the result provides the eye appeal, it is evident that the operator should view his work with the same critical eye as would the prospective buyer. Thus, finishing operators should not be chosen haphazardly, but should be examined carefully for the following necessary qualifications:

1. Power of observation
2. Inherent neatness
3. Mechanical adaptability
4. Skillful technique
5. Willingness to learn new methods.

Qualifications of Operators

Each organization has its own peculiar local conditions and the choice of operators suitable for the type of finishing work is its own particular problem.

Neglect and unfamiliarity with the numerous units which make up the spraying equipment are all too often responsible for defective finishes. The operator should understand fully the particular function of each part of the apparatus and should also know how to make the necessary adjustments to maintain maximum operating efficiency. Any of the standard manufacturers of spray equipment are only too glad to give information on proper use and care of their product.

Spray Systems

There are three major systems for spray application in use at the present time; namely, pressure feed, suction feed, and gravity feed. The pressure feed system consists essentially of a supply tank under pressure from which pipes or hose conduct

the material directly to the spray gun. The suction feed system utilizes the air passing through the spray gun to create a vacuum which draws the material from the supply cup which is fastened directly to the gun. The gravity feed system depends on the supply tank being situated sufficiently higher than the spray gun so as to provide a constant flow of material to satisfy the capacity of the gun.

The gravity feed system is limited to materials of comparative low viscosity which flow rapidly through the feed lines. The suction feed system may be used to advantage only where a small amount of finishing is to be done and only with lacquers and enamels of ordinary consistency. Materials of higher viscosity cannot always be raised from a suction cup easily enough to provide uniform fluid flow.

Performance

The pressure system has none of the foregoing disadvantages. Material of practically any workable consistency may be applied with this system, provided the correct adjustments are made to feed and atomizing pressure and the recommended air cap and fluid tips are used.

Benefits of Pressure System

Nearly all of the manufacturers operating production lines where rigid schedules must be maintained use the pressure feed system. This insures substantial, uniform flow, uninterrupted operation, and eliminates the annoying and costly delay occasioned by temporary halts for refilling fluid cups. Furthermore, the pressure gun is much lighter in weight than the cup gun which carries the additional weight of approx-

Walker's

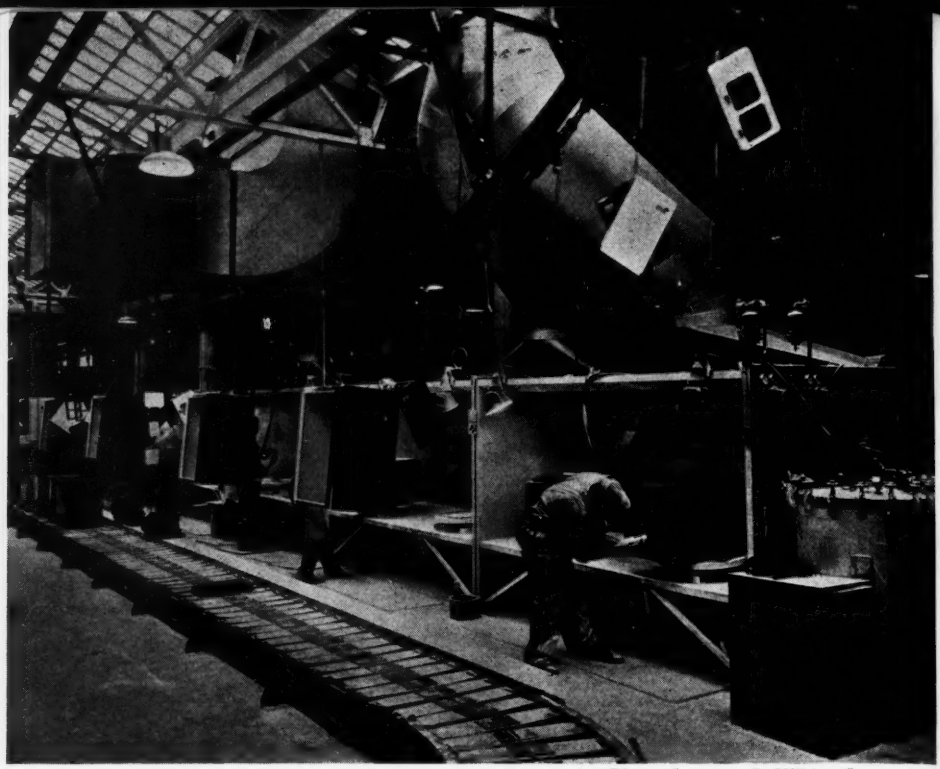
CLEAR HARDWARE LACQUER No. 702

Recommended for outdoor durability, having extreme non-greening qualities, as well as perspiration resistance.

H. V. WALKER CO.
Elizabeth, New Jersey

FINISHES TO FIT THE PRODUCT

New England Warehouse, BROWN & DEAN, Providence, R. I.



(Photo Courtesy DeVilbiss Company)

When the proper care is taken of the finishing equipment along the production line, shutdowns are reduced to a minimum.

imately one quart of material. The operator, therefore, becomes less fatigued and his efficiency is maintained at a higher standard, especially near the end of the working day.

Scope

Lost motion is eliminated by a single thinning and straining operation into the pressure tank, which can be of almost any capacity. Pressure tank systems are available which have continuous feed from a central supply unit.

Care of Spray Gun

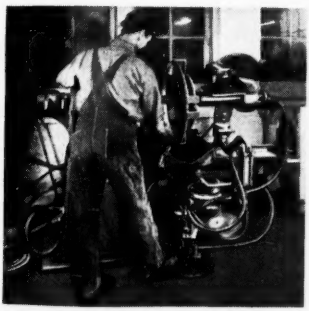
The care of the spray gun is of utmost importance. A spray gun is really a precision instrument and should be treated as such. The small amount of attention needed to maintain the apparatus in topnotch condition pays big dividends, not only in the quality of the finish obtained, but also in the peace of mind of the operator using a well-kept tool. An occasional cleaning and oiling during the day is an easy task.

The packing on the spray gun should be renewed periodically to prevent air leaks and also to keep a soft rather than a hard substance in contact with parts that are packed, thereby reducing wear. In putting a gun to soak, the packing should not be placed in solvent, as this helps deterioration of same. Putting a gun to soak will become practically unnecessary if the gun is cleaned immediately after use. Considerable time is also saved by an immediate

Let's Get Down to Costs!

If a machine can give you a better finish and do it in less time than it now takes you, and if it is priced so it can quickly pay for itself — that machine will cut your costs.

Such a machine is the new Continental Type D-A Semi-Automatic Polishing and Buffing Machine. Users report savings that put polishing and buffing departments in line with other operations. They eliminate the "bottleneck" in finishing. Operators like them because they can now earn a better rate with less fatiguing effort.



Midwest bicycle manufacturer polishes rims for chrome plating and buffs to a mirror-like finish with Double Action Continentals, saving up to 41%.

The Continental Type D-A is a double action *air operated* machine with single foot pedal control which leaves the operator's hands free for loading and unloading the chuck. Work is floated into wheel. Frequently several surfaces can be covered in a single operation. Work holding spindle operates at speeds from 8 to 40 R.P.M.

The double action provides motions that make it possible to handle a far wider range of work with greater economy. Work such as cooking utensils, reflectors, fixtures and electric appliances can be buffed or polished at a cost that it will pay you to investigate.

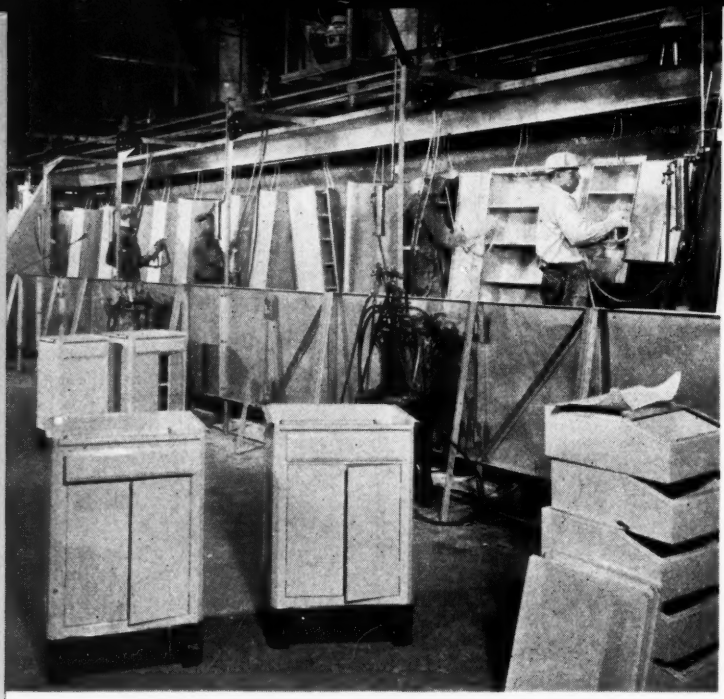
Write for bulletin on Continental Semi-Automatic Polishing and Buffing Equipment and request a time study on your work.

CONTINENTAL ROLL & STEEL FOUNDRY COMPANY

Industrial Equipment Division
Railroad Ave., East Chicago, Ind.

Plants: Coraopolis, Pa., Wheeling, W. Va., East Chicago, Ind.

® **CONTINENTAL**



Spray booths and spraying equipment that is scientifically designed enables operators to produce better work in shorter time.

(Photo Courtesy DeVilbiss Company)

cleaning while the material is still soft, thereby being much more easily removed. It requires but little imagination to realize that a dirty air cap or fluid tip causes an improper pattern.

Following are some of the most common causes of application difficulties and their corrective treatment.

Pattern

The necessity of proper spray pattern cannot be over-emphasized and the operator should always make preliminary tests on a panel or sheet of paper before starting actual production. There are various causes for improper spray pattern, but the most prevalent are:

1. Dirty or damaged air cap
2. Dirty or damaged fluid tip or needle
3. Incorrect air pressure
4. Unsuitable air cap
5. Improper adjustment.

If the pattern is of the eclipse or half-moon shape, the operator can easily determine whether the cap or fluid tip is at fault by reversing the air cap. Should the hollow side of the pattern appear opposite to that of the previous spray out, the responsibility may be laid to either a dirty or damaged air cap. In the event the pattern remains the same after reversal of the air cap, the trouble is due to a dirty or damaged fluid tip or needle. If it is determined that either the fluid tip or needle is damaged both should be replaced. It is poor practice to replace one and not the other, as this may not rectify the trouble.

A pattern having heavy ends and thin center is known as split spray and is caused either by a dirty air cap or by improper air pressure—the latter generally being at fault. Plugging or partial plugging of the smaller holes in the air cap, which are intended to deflect the concentrated air stream into the fluid stream, causes split spray. The condition, however, is not so common as too high air pressure on the cap.

Cleaning Caps and Nozzles

Caution must be exercised in the

cleaning of the fluid tip and cap. Under no circumstances should a pin, needle, or other metal instrument be used. The slightest scratch may ruin the delicate parts. When cleaning is necessary it should be done with a pipe cleaner or soft broom splint which will not scratch the metal.

Improper adjustment of the spray gun may cause streaking, excessive orange peel or spray dust. The manufacturer's recommendation for correct use of the particular apparatus should be carefully adhered to.

Choice of Caps

The proper choice of cap is necessary to produce correct pattern. In general, most three-hole caps are satisfactory for pressures up to 50 pounds with material of low viscosity, and they may also be used in certain cases with pressures above 50 pounds where a more viscous or heavy material is to be applied. This is because materials of lower viscosity are easily atomized and a split spray often results when air pressure higher than that recommended is used. Heavier material, being more difficult to atomize, does not show a split spray as readily as the lighter material.

Where more than 50 pounds of air is to be used on an air cap a multiple hole cap is usually recommended so as to assure perfect atomization without distorting the spray pattern. There are several types and styles of this latter cap, each one having been designed for a specific purpose.

Air Supply

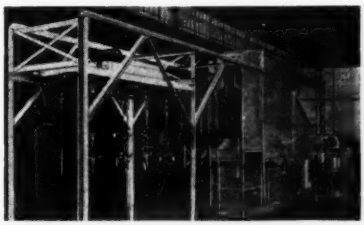
The air supply or cubic foot capacity of an air compressor also plays an important part in the selection of caps, as one type often will consume more cubic feet of air per minute

DETREX means . . .
ENGINEERED QUALITY
in all Cleaning and Finishing Jobs

Whatever your cleaning and handling requirements...whether for hand-operated or completely automatic metal cleaning and finishing equipment...Detrex Engineers will fit your needs, service your equipment, and give you unbiased recommendations.

The one complete source for Solvent Degreasers, Stabilized Safety Solvents, Alkali Washers, Compounded Cleaners and Strippers, Bonderite Equipment, Industrial Ovens, Dip Tanks, Wet Spray Booths, and Wet Spray Booth Compounds.

WRITE FOR FREE DATA OR DEMONSTRATION.



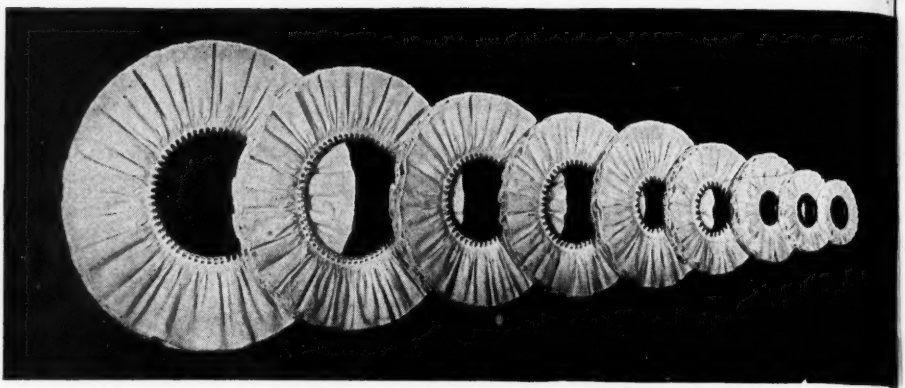
One Dip Conveyorized Detrex Degreaser with Solvent Still and Filter.

Mammoth Alkali Washing Machine.

DETROIT REX PRODUCTS COMPANY

13017 HILLVIEW AVE. *Branch Offices in Principal Cities* DETROIT, MICHIGAN

AIRWAY *Ventilated* BUFFS



A TYPE FOR HIGH SPEED — SEMI OR FULL AUTOMATIC — OR HAND POLISHING

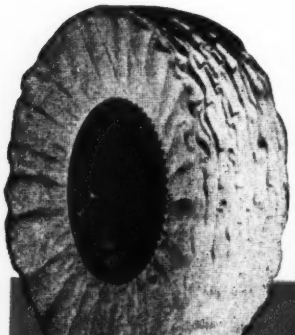
Permanent tapered spindle adapters supplied on all small sizes for use on tapered spindles.

5 FEATURES "AIRWAY" COOLING

1. Permits 50% to 100% higher speeds.
2. Faster cutting and does not ridge the work.
3. Eliminates burning.
4. Raveling eliminated, requires no raking.
5. Saves compound.

Made in all grades of cloth. Only bias material used. Available diameters 5" to 18".

Use half as many sections.
Wears twice as long.
Costs half as much.



JACKSON BUFF C
21-03 41st AVENUE

FS AIRWAY *Ventilated* BUFFS

VENTILATION

The AIRWAY BUFF is used with metal center plates and flanges so arranged as to allow the centrifugal action of the buff to draw air in at the sides of the wheel and pump it out radially between the buff sections. This circulation of air through the AIRWAY keeps it cool under most severe operating conditions, entirely eliminates burning and thus prolongs the life of the buff. This permits 50% to 100% higher speeds.

COMPOUND SAVING

The bias construction of the AIRWAY eliminates ravel and wasting of buff as well as compound.

The ventilating feature keeps the buff cool and reduces the tendency of the compound to melt and be thrown off.

The AIRWAY should not use more than 50% of the compound used with a conventional buff.

OTHER ADVANTAGES

The AIRWAY requires no raking, has a very fast cut and does not ridge the work. It is clean because there are no cross threads to pull out and the composition stays on the buff.

It has a wide face and usually two sections are equivalent to four of the conventional buffs. This should be considered when comparing prices with conventional buffs.

WARNING NOTICE

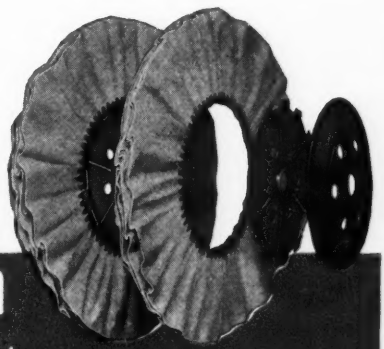
Jackson Buff Corporation of Long Island City, New York, has rights to U. S. Patents Nos. Re 19,894 and 2,140,208 which have broad claims covering an air-cooled buff having means for the admission of air through the sides of the buff. Owner intends to protect these rights and to stop infringement.

MATERIAL USED

Special sheeting used for cutting or coloring as your requirements demand. All bias cut, no ravel, no waste, no dirt.

Center plates and flanges made to suit the customer's spindle diameters.

Write us direct for samples or get in touch with a Licensed Jobber or Distributor.



F CORPORATION

LONG ISLAND CITY, N.Y.

than another. As an example, we will take a five-hole cap that consumes approximately 11 cubic feet of air per minute at 80 pounds pressure, as against a seven-hole or more that consumes approximately 22 cubic feet per minute at the same pressure. There may be several guns in operation at the same time consuming more air than the capacity of the compressor, whereby a steady pressure cannot be maintained due to the excessive load.

The proper way to remedy low or insufficient air supply is not by using caps of lower consumption if one of higher consumption has been recommended, but by installing adequate equipment to assure required pressure maintenance at necessary consumption. Sometimes the manufacturer cannot shut down for changes at that particular time and has to look for some other means out of his difficulty, even if only temporarily. In such a case, he may resort to a cap of lower air consumption, or by cutting out the necessary number of guns then in use at one time, he is assured proper air supply for the remaining guns in operation. Of course, in the first instance where he resorts to using other than recommended air caps, he probably sacrifices both quality and speed, where in cutting guns out of line he sacrifices only speed.

It may seem to the reader that such a case as the aforementioned one is an absurdity, but the writer has actually run into this same difficulty in one of the largest manufacturing plants in the East. The particular case was one where they were spraying a material requiring about 90 pounds of air pressure to assure proper atomization. The air line was one that supplied the rest of the factory, and upon doing so at certain times the pressure dropped as low as 40 pounds, thereby causing an improperly atomized spray, resulting in some very poor work.

Recommending Air Pressures

One of the major difficulties in spray finishing is the determination of the proper air pressure for applying a particular material with available apparatus. A question often asked a paint supplier is "what air pressure shall we use with your material?" This can be answered only when complete information is furnished on type of equipment, available air supply, length of fluid hose, and so on.

Spitting

Intermittent fluid flow or spitting is usually caused by a leak in the fluid tank or line. If the leak is found to be in the tank, usually all that is needed is a new gasket between the tank and pressure head. If the leak is in the line, tightening or repairing the defective part will remedy this.

Transformer

Probably one of the most important and necessary pieces of equipment that is overlooked is the transformer or filter on the air line. The purpose of this piece of equipment is to remove oil and water from the air line. The writer has been in several plants where there was positive indication that these filters had not been drained in months. Consequently, the spray men were having difficulty with material being sprayed and naturally blamed the material, whereas the real difficulty was caused by oil and water seeping into the air line. It is good policy to acquire the habit of draining the air line filter every 24 hours; not that it is necessary to drain it this often,

but in so doing one gets into the habit and thereby does not let it go by for weeks at a time and think of it only after he has spoiled a large portion of the day's production.

Dirt

Probably one of the greatest contributions toward a ruffled temper is dirt and dust settling on the work. It is hard to keep a spray room absolutely dirt free, but some things that help are: Keep all dirty rags and cheesecloth out of spray room; also any sanding or steel wooling. Do not wear clothes that have a tendency to evoke a cloud of lint or dust every time you move your arm back and forth while spraying.

Some of these things may not seem important, but many rejections caused by dirt can be eliminated by exercising greater care in keeping at a minimum the amount of dirt accumulating in the spray room. A tack rag is necessary to obtain consistently clean work, as it will remove all dust and dirt where blowing with air not only fails to remove all that is desired, but may cause dried spray dust from the booth to start flying around in the air and eventually land on the article being sprayed.

The spraying of the spray booth with oil or some material that will remain moist or tacky will help to keep most of the spray dust from flying around in the air. Oiling of the floor is also an added help in keeping down dust and lint.

The writer will be glad to discuss any particular finishing problem the reader may have, and will do so upon receiving information pertaining to same.

Taber Abraser Model J Bulletin 3901. A bulletin describing the Taber Abraser Model J Portable—the calibrated wear tester for scientific grading of surface finishes—is now being issued by Taber Instrument Company, North Tonawanda, N. Y. The Taber Calibrated Abraser Testing Outfit is said to be a completely co-ordinated physical testing outfit for measuring the amount of wear and abuse that various types of surfaces and surface finishes will withstand.

The measurements can be accomplished with such precision that the resulting information, coupled with aging and chemical resistance determinations, makes possible accurate predictions of the useful life of the finish. The Taber Abraser is said to enable manufacturers of finishes to "laboratory test" new developments before releasing them to the consumer. In the same manner, large industries and consumers can purchase finishing materials according to their respective merit and value following a complete test.

A copy of Taber Abraser Model J Portable Bulletin 3901 will be sent free upon request.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

R-700

An unusual Rust Inhibitive.
Dries with lacquer speed.
Very flexible baking schedule.
Resists salt spray remarkably.
Very light in color.
Ideal vehicle for bronze powders and pastes.
Suggested wherever RUST is a production problem.
Remarkably adherent as primer under baked finishes.
Variations for special requirements available.
Our pamphlet will be gladly sent on request.

The Varnish Products Co.
5208 HARVARD AVENUE
CLEVELAND, OHIO

Barrel Finishing of Metal Products

Additional factors in the barrel finishing of plastic materials.

By H. Leroy Beaver

IN ADDITION to what we have previously written on this subject in the two preceding issues of PRODUCTS FINISHING, we find there is still much left for comment and clarification.

First, we think we should correct what might be an erroneous impression that might be gained from what we said respecting barrels for plastic finishing that were constructed from a metal shell which was then lined with maple liners. In re-reading this text, we can see where from the manner in which the barrels were described that it would seem to be a virtual recommendation of this type of barrel over any other variety. This, of course, is far from the meaning we intended to convey and all through the series we have tried to present the facts relative to the various types and kinds of barrels as fairly and impartially as we could in the light of our own research experience. Thus, in designating a high and narrow type of barrel we have used the Abbott Barrel as the illustration because it was the first of this type, and for the same reason we use the term Baird for the long and narrow type for the reason that this was also the first of its type of American made barrels. (The Edmunds English Barrel would naturally come under the heading of long and narrow type classification.) Anywhere throughout this series the mere mention of a particular barrel by name does not in itself constitute an endorsement of that particular make of barrel.

Now in the finishing of plastic materials, as well as other non-metallic materials that may be formed from wood, bone, rubber, shell and fibre, many styles and types of barrels are used, with both metal shell and those of straight wood construction. We know personally of all wood barrels used in such applications that have been in continuous operation for periods of twelve years and upwards and are still giving satisfactory service even though the thickness of the shell is somewhat reduced. Barrels of the all-wood type are generally set up in such a way that the joined sections composing the panels of the barrels are doweled with flat dowels that reach across from one sector to the other, and these are tightly set with glue. Once a dry barrel is set

up in this way, leakage is impossible and this type also has another quite important factor in that there are never any open seams at the edges of the panels such as might occur in a metal shell barrel fitted with a wood liner. Where such lining fitting is poorly or indifferently performed, there have been cases where the seams between the panels were left so wide that the points and in some cases the thin plastic plates being finished would wedge in the cracks between the sections and become broken in this way. Generally speaking, there are entirely satisfactory barrels for plastic and other non-metallic finishing operations readily available in both metal shell wood lined and in all-wood construction.

In order to more adequately illustrate this we have asked for and obtained from another of our foremost barrel manufacturers additional illustrations of typical barrels used in the finishing of plastics. In a previous paper we mentioned the use of a barrel fitted with screen panels and used for what we termed a definning operation of plastics and other materials susceptible to finishing by the barrel method. A good many of our interested readers wanted to know immediately just what sort of screen was used in this operation, and the accompanying illustration designated as Fig. 1, of a two-bank barrel very clearly illustrates this as a screen material of expanded metal, but this may be varied in type, considering the kind of materials to be operated upon. In connection with this illustration, there came to us samples of moulded rubber products including a six-inch rubber quoit, rubber shower bath spray ring, rubber basin plugs, small bumpers and rubber tips that had been beautifully finished, and in this type of barrel loaded to one-third full, the operating time was from one-half hour to five hours, depending on the type of the part finished. The illustration Fig. 1 should also be taken in connection with the illustration of metal shell barrels which appeared in the June issue of PRODUCTS FINISHING, and a clear comparison can be drawn between the two types. From the point of view of expense both types are comparatively inexpensive.

We have previously discussed the important question of the length of time involved in the finishing of a barrel load of plastic materials. That the time factor is still unsatisfactory both to the makers of equipment and the finishers of this class of non-metallic materials, it should not be inferred that no progress whatever has been made, for this also would not be true. Operations on this class

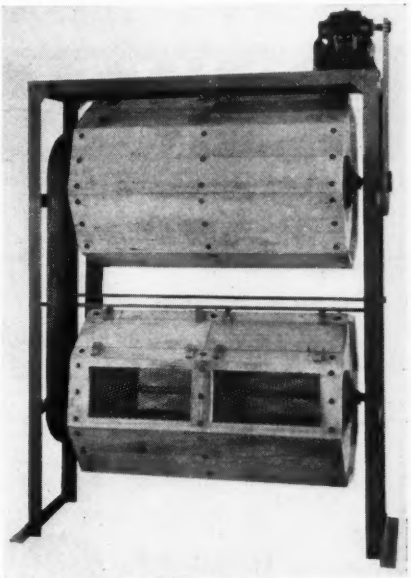


Fig. 1—A double bank plastics finishing barrel showing the expanded metal screen opening.

of materials that say ten years ago required an operating cycle of from 50 to 72 hours are now being performed on a cycle of from 18 to 22 hours, that is on such materials as cast phenolics, casein and the cellulose materials. For the compression moulded materials, such as bakelite and urea, the former operating cycle of from 12 to 18 hours has been worked down until we now can obtain satisfactory finishes on these materials in from 1 to 5 hours. Even with these gains in production time, those of us who are conducting the research on the subject realize all too well that the time cycles are still too long, and we cannot gauge them by the time cycles as applied to the barrel finishing of metal products because in the latter we have weight factors to aid us that we will never be able to utilize in the finishing of lighter non-metallic materials. Two approaches to the reduction of the time factor might be expressed as a search for a compound that will remove in one operation all of the tool marks from plastic parts, as well as mould marks and manufacturing faults and at the same time provide a highly lustrous finish. We have all done a great deal of work along this line but cannot report other than that we are still more or less in the dark as to just what such a compound will be. The second factor is the search for some chemical means such as we have found and use for casein parts, and the development of similar chemical means for finishing phenolics. Either of the chemical dip methods require only a single barrel operation, that being the abrasive operation for the removal of die and tool marks.

In the casein industry, the chemical method is well known and extensively used, but on the other hand, in the phenolic section we have not as yet been able to evolve a satisfactory chemical dip method. Eventually, we believe it is safe to say that by the use of certain solvents that act on the surface of the plastic materials we will be able in many cases to obtain satisfactory finishes by a single barrel operation, and in others satisfactory finishes by a dip method in a solution developed for the purpose and not unlike the present operation of bright acid dipping on nonferrous parts. All of this, however, will require the closest co-operation between the manufacturer of the plastic materials and those of us who are conducting the research to determine the best methods for giving such plastic parts a satisfactory marketable finish.

We have previously dwelt on the factor of the difference between the specific gravity of the plastic materials being barrel finished and the

LIONITE
POLISHING GRAINS

1. CBT LIONITE
An etched grain built to withstand the shock and stress of rough work. Sizes 10-90 incl.

2. EPT LIONITE
An etched grain designed to prevent glazing. For operation where little self-dressing of the wheel occurs. Sizes 24-90 incl.

3. ST LIONITE
A finishing grain. Chemically treated to facilitate "greasing." Sizes 100-240 incl.

THE
General Abrasive Co.
NIAGARA FALLS, N. Y.

wood materials used in the finishing process. We know that on parts made from mouldings of bakelite and urea that very definitely we must find a heavier polishing material because parts made from these materials at least will withstand greater pressure, and in this way a further reduction in finishing time might be accomplished. Along with this factor, we must also keep in mind the fact that many of these parts have light sections, design weaknesses and keen sharp edges, and in such cases if polishing materials of equal weight were used or slightly less than the parts themselves, the pressure would be such that considerable breakage might well be expected.

In some recent tests we have run on cellulose acetate where used polishing materials, or fillers, as they are better known in the trade, of equal or greater weight than the parts themselves, we found that due to the softness of this particular material that we obtained a wavy or uneven surface or perhaps we might better describe the surface as being rippled. In some aspects of the subject, we can see where it might eventually be necessary to work out definite operating techniques for the various types of plastic materials, eventually reaching some sort of the same basis, as we now can very satisfactorily apply on the barrel finishing of metal products of various types.

The loading of barrels in the finishing of plastics must also be considered, and this differs somewhat from the method we use in barrel finishing of metal products, for while in the latter a two-thirds loading is generally considered the most satisfactory, this is not true of plastic materials. For the loading, we come back to a method practiced to a considerable extent in the loading of the tapered periphery barrels for cutting down, where the long swing of the load gives us the fastest cutting action when the barrels are filled at just slightly more than one-half full. This is due to the fact that the fillers or wood burnishing mediums are in some cases quite large and their full action would be somewhat restricted if the same loading procedure were used as that applied in the finishing of metal products. Then again, in the definning operation, where there are many classes of parts that may be operated alone there are still others where it is necessary to use such filler materials as the ¼ x ½ in. pegs or ¼ x ¼ in. or ½ x ½ in. wood blocks for cushioning and to prevent damage to parts operated alone.

When we speak of wood shoe pegs as a medium for use in the finishing of the non-metallic materials, we do

RUST IS ROUTED!

DEOXIDINE prepares metal surfaces perfectly for painting.

ELECTRO, SPRAY and **THERMOIL GRANODINES** protect against rust and preserve paint.

LITHOFORM keeps paint intact and lustrous on zinc and cadmium surfaces.

Write for bulletins

AMERICAN CHEMICAL PAINT CO.

BOX 303 • AMBLER, PENNA.

not wish to convey the idea that all of the pegs are identical with those used to peg fast the soles of heavy shoes, for this is far from the fact. These pegs may run in size from a shank of 3/32 in. square and ½ in. long to pegs that have a shank of ¼ in. and a length of up to 1½ in., and with either a blunt nose or a sharp point. In the larger sizes, they do not even remotely resemble the shoe pegs which we would naturally picture in our mind's eye as being used in the shoe manufacturing industry. They are all formed with automatic machinery and are invariably made from maple wood as are the blocks used at times in connection with the pegs. The reason for the wide variety of sizes is the same as the reason for a wide range of sizes of steel burnishing materials, for there are large and small angles and grooves on plastic parts as well as metal parts and then, too, many moulded plastic parts have holes in which if only one size peg, the conventional shoe size were used, the pegs would wedge and prove difficult to remove. All in all, we are required to exercise about the same amount of care and attention to such details in the finishing of plastics as we do in the finishing of metal products. This is equally true of what we term the "filler" in plastic finishing, that is, the wood fiber, called sawdust by some, and this must be selected for grain size also to prevent plugging in holes and grooves.

We have had a number of inquiries from readers asking the purpose of the addition of glycerine to the warm water bath in which plastic is placed prior to slicing to properly soften it, and the reason for this is that it acts solely as a lubricant in the slicing operation.

We had hoped in connection with this issue to present some illustrations of the various sizes and shapes of wood pegs used in the plastic finishing operation, but the photographs have not been completed and hence must be left to a later paper on this same subject, but to any of the readers of the series who may be interested in examining these materials, we have obtained a quantity of them and will be glad to send representative samples if you will address your request either direct to PRODUCTS FINISHING or to the writer.

Acknowledgement is made to Mr. Rudolph R. Seibert, Rochester, N. Y., for supplying the double bank barrel illustration showing typical definning barrel.

"INDIAN BRAND" EMERY
absolutely uniform

"INDIAN BRAND" Turkish and Naxos Emery

YOU GET—
Absolute uniformity.
Highest quality.
Greater capillarity.
Longer wear.
Prompt delivery.
Write for trial lot.

"HECCO BRAND" American Emery

HAMILTON EMERY & CORUNDUM CO.
CHESTER • MASS.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

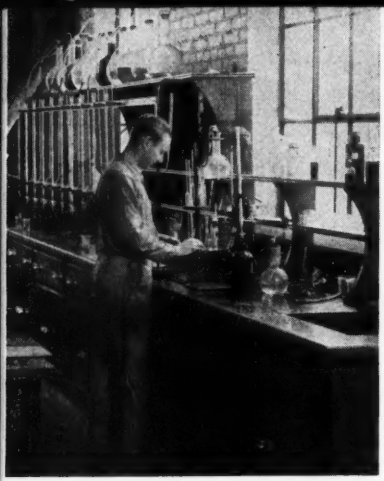
Udylite-Cadmium is a bright, non-porous deposit of pure cadmium applied electrolytically to metal surfaces for the primary purpose of rust prevention. ☆ It is an unusual finish because of the combination of advantages it offers. It efficiently prevents rust, has an attractive appearance and costs little. ☆ Udylite-Cadmium is easily and economically applied to a broad variety of metals by the Udylite process of cadmium plating—probably the most simple of all plating processes. ☆ The combined research and service facilities of Udylite, the pioneer organization in the development of cadmium plating are available for consultation at all times.

Udylite-Cadmium Is The Only Finish Offering ALL These Advantages

- ★ **Efficient rust protection**
- ★ **Attractive appearance**
- ★ **Simple, economical application**
- ★ **Broad application to a variety of metals**
- ★ **Easy to solder**
- ★ **Low electrical contact resistance**
- ★ **Resistance to alkaline solutions**

THE UDYLITE CORPORATION
1651 East Grand Blvd., Detroit, Michigan

New York, 30 E. 42nd St. | *Chicago,* 1943 Walnut St. | *Cleveland,* 3756 Carnegie Ave.

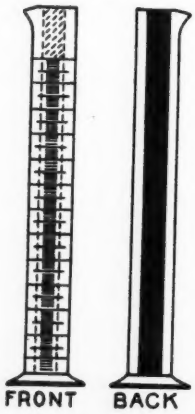


the FINISHING forum

Painted Band on Graduate Prevents Errors in Readings

By A. H. WAYCHOFF

ANYONE in the laboratory or shop who uses glass graduates or similar equipment for measuring liquids accurately will find the suggestion illustrated and described herewith very helpful. Very often, errors in measuring liquids from glass graduates occur because the graduation marks on equipment of this type have become practically obliterated. In cases such as this and also on new equipment of this type, the markings can be made readily visible by placing a dark background behind the markings.



Drawing showing manner in which colored band can be placed on graduate for making markings easier to read.

A background for this purpose can be painted directly on the outside of the graduate directly opposite to the markings on the glass graduated cylinder. A dark colored enamel or lacquer can be used and the band need not be more than one-quarter to three-eighths of an inch in width. For maximum legibility, the band can be painted the entire length of the graduate. As to the color of the band, red finishing materials have been found by experimentation to be the best suited for the purpose.

Centenary of Electroplating

IN the year 1838, the first patent involving the process of plating by electrolysis, based upon Michael Faraday's discovery of the fundamental principle of the dynamo, was taken out by Dr. O. W. Barrett, Birmingham, England. The first magnetic machine used in the commercial practice of electrodeposition was made by John Stephen Woolrich in the year 1844. A view of the machine constructed by John Stephen Woolrich is shown in the illustration herewith.

The Woolrich electroplating ma-

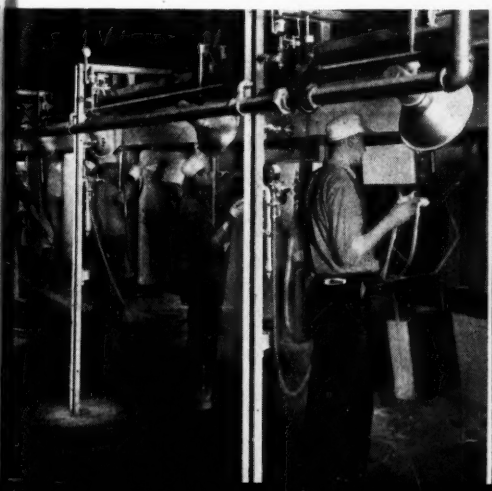
Do you have a metal finishing problem?

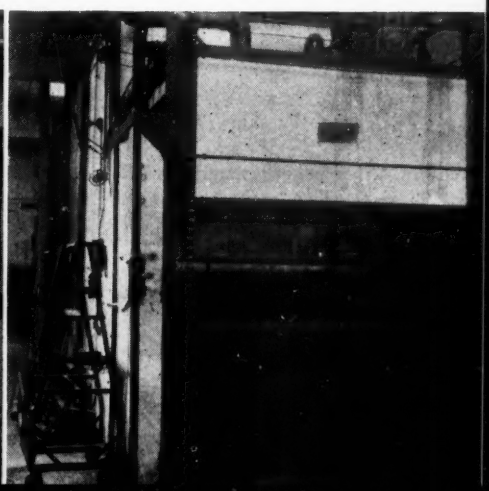
Through the cooperation of outstanding authorities in the fields of metal cleaning, plating, burnishing, lacquering, and so on, PRODUCTS FINISHING is prepared to aid you in the solution of your finishing problem. There is no charge for this service.

Also . . .

If there is a "kink" or short cut in use in your shop, send in a description of it. . . . Each one published will be paid for.

PRODUCTS FINISHING
431 MAIN ST. • CINCINNATI, OHIO





chine was constructed in a heavy wood frame erected in rectangular form. Inside of the rectangular form four sets of permanent horseshoe magnets were bolted and an armature inserted to revolve between the poles of the magnets. The machine was 5 ft. 4 in. high, 6 ft. long and 2 ft. wide. It is stated that Michael Faraday visited the plant where the machine was installed, and expressed his delight at seeing the practical use of his discovery.

A second dynamo made for electrodeposition was constructed by Woolrich in 1851. While this machine was similar in electrical design to the earlier model, mechanically it was a great improvement. The weight of the machine was approximately one ton. This may be contrasted with the smallest present-day machine in use in England, the dimensions of which are 8 in. long and 5 in. high and weighing approximately 20 pounds. It is interesting to note that this small machine is capable of producing ten times the power of either of the two earliest machines.

(Reprint Courtesy Industrial Britain)

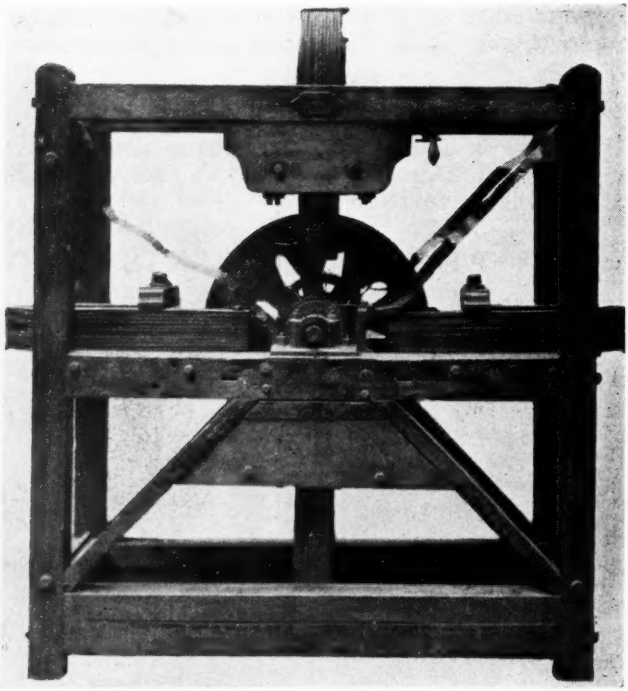


Illustration showing first dynamo for electroplating.

Porcelain Enamel Shows High Abrasion Resistance in New Standard Test

THE development of a tentative standard test for abrasion resistance of porcelain enamels has brought to light some interesting evidence regarding the comparative wear-resisting qualities of various finishes or surfaces.

The test was developed as one of the activities of the Technical Research Section of the Porcelain Enamel Institute, 612 N. Michigan Ave., Chicago, Ill., with the work being conducted by W. N. Harrison of the National Bureau of Standards and Dr. Paul L. Smith, Research Fellow of the Institute.

While the major purpose of the research was to devise a standard test which might be utilized in any enameling plant laboratory, considerable by-product information was obtained. The result is that the abrasion resistance test may find application not only in the enameling field, but also in the case of other materials having at least moderately smooth and glossy finishes, such as glazed ceramic ware, glass, plastics, paints and lacquers.

Testing Procedure

Flat specimens, usually about four inches square, were selected for the testing procedure. The specimen, in each case, was laid face up in a holder and the top of the specimen placed in a brass cylinder covered with a jacket of abrasion-resistant rubber.

Next, a standard weight of feldspar abrasive was placed on the face of the specimen and a standard weight of rust-resisting ball bearings placed in the cylinder. Then a top was put on the cylinder and tightened. A small amount of water was added in order to avoid the effect of variations in atmospheric humidity.

Finally, the entire assembly was placed in a rotary screen shaker and agitated horizontally at a specified speed, in order to produce the desired abrasion effect.

The specular gloss of each specimen was determined by photoelectric means before and after the test, and the percentage of the original specular gloss retained after the test was taken as the abrasion index. Abrasion index values obtained on vitreous enamels by this method have ranged from more than 70 for a hard, acid-resisting sheet-iron enamel, to less than 20 for a soft, high-lead, wet-process enamel for cast iron.

The test procedure was tried out in several different laboratories and the results carefully checked. It was found to be imperative that the procedure be closely controlled so that uniform methods would be assured. When that was done, the results were in essential agreement and the test was adopted as a tentative standard of the Porcelain Enamel Institute.

Use of Various Abrasives

Mr. Harrison reported that while feldspar has been found excellent as an abrasive for vitreous enamels, the testing of much harder or much softer materials to determine differences within a given class would make the use of correspondingly harder or softer abrasives desirable.

For comparing different types of materials with each other, feldspar may be used, but instead, a uniform abrasion treatment necessary to produce a given effect is preferred.

Borolon
TRADE MARK

First quality aluminum oxide abrasive grain manufactured in our own electric furnace plant under strictest standards of quality and uniformity. Available in four types (CT, T, B, TB), each of which is most efficient for polishing work within its field of application. Write for Abrasive Grain Data Sheet No. 1 giving complete details. Samples sent of grain sizes you specify.

POLISHING GRAIN

ABRASIVE COMPANY
Division of Simonds Saw and Steel Company
Tacony & Fraley Streets · Philadelphia, Pa.
Chicago Branch: 1624 South Western Ave.

NEWS of the Industry

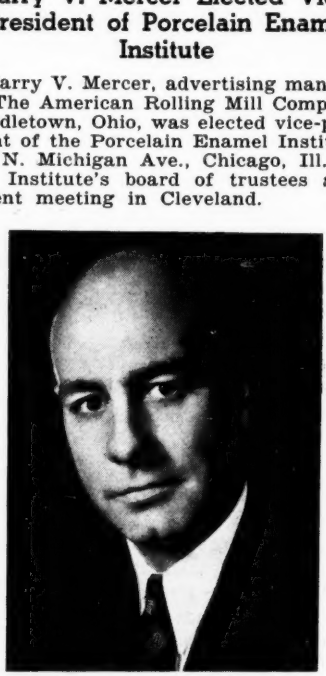
I. T. Darlington Joins Staff of Stanley Chemical Company

The Stanley Chemical Company, East Berlin, Conn., announces that Mr. I. T. Darlington, a well-known authority in the field of industrial coatings, has recently joined its technical organization. Mr. Darlington is a graduate of Lafayette College and did post-graduate work at Columbia University. His chemical experience has always been in the field of organic chemistry. Following the war he was closely associated with the development of lacquers and lacquer materials, with laboratory and technical experience in the manufacture of nitro cellulose and solvents. During the past 18 years, Mr. Darlington has served in various capacities with some of the largest manufacturers of industrial coatings. He has had direct charge of production and served as chief chemist in one of these plants. Mr. Darlington has been closely associated with the development of automotive finishes and the present-day synthetic finishes.

Mr. Darlington joins the research and development staff of the Stanley Chemical Company under the direction of Mr. E. M. Hayden, Technical Director. His knowledge and experience will be devoted to the study of definite problems and the development of new materials to meet the ever-increasing demand for highly specialized products. Mr. Darlington will also be available for sales service work and will be directly available to customers in an advisory capacity.

Harry V. Mercer Elected Vice-President of Porcelain Enamel Institute

Harry V. Mercer, advertising manager of The American Rolling Mill Company, Middletown, Ohio, was elected vice-president of the Porcelain Enamel Institute, 612 N. Michigan Ave., Chicago, Ill., by the Institute's board of trustees at a recent meeting in Cleveland.



Harry V. Mercer

Mr. Mercer, a member of the Armco organization for more than 20 years, has been closely associated with Porce-

lain Enamel Institute activities in recent years. As head of a sizeable staff of advertising and publicity men, he has a wide background of co-operative work in the steel industry and associated groups.

Dust Control Equipment Manufacturers Expand Co-operation With Other Groups

In line with its policy adopted some months ago, announcement is made by Arthur J. Tuscany, executive secretary of the Dust Control Equipment Association, Penton Bldg., Cleveland, Ohio, that at a recent meeting of the Association held at the office of Tuscany, Turner & Associates, Trade Association Manager, Cleveland, Ohio, an interchange of ideas was arranged for between the members and the chairman of the Industrial Hygiene Codes Committee of the American Foundrymen's Association.

Mr. James R. Allan, chairman of this Committee, was present at the meeting and described the progress being made by his group in completing certain industrial codes. While Mr. Allan's discussion dealt more particularly with the Metals Cleaning Code now nearing completion by the A. F. A. Committee, he also outlined some of the future activities which his Association will engage in, all of which are of keen interest to manufacturers as well as users of dust control equipment.

The Dust Control Equipment Manufacturers' co-operation with other technical societies and certain of the State Labor Departments was reviewed at the recent meeting and suggestions made for continued handling in various directions.

The Association's work with manufacturers of industrial machinery involving dust hazards has thoroughly proved the value of the plan inaugurated earlier.

Third Annual Forum Proceedings

The Proceedings of the Third Annual Forum of the Porcelain Enamel Institute, 612 N. Michigan Ave.. Chicago, Ill., are just off the press. This 228-page book contains a complete record of the papers presented and verbatim reports of the discussions that followed during the Forum meetings held at the University of Illinois.

The subject matter covers a multitude of current problems in the fields of enameling shop practice, laboratory testing, and the use of iron and steel for enameling stock.

Consequently, the Forum Proceedings will hold definite interest for everyone who supplies materials for the porcelain enamel industry, as well as for those directly connected with enameling shop practice. Large-scale users of porcelain enamel and students and research workers in ceramics will also find much useful information in this book.

Copies of the Third Annual Forum Proceedings may be obtained at $2.00 each from the Porcelain Enamel Institute, 621 N. Michigan Ave., Chicago, Ill. Upon request, a copy of the Proceedings of the First Annual Forum (regular price, 50 cents) and the Second Forum (regular price, $2.00) will be included without charge with any order for the present volume.

National Metal Congress and Exposition

Metal and metal products companies appear optimistic about prospects for

METSO CUTS CLEANING TIME

ONE PLANT using Metso 66 Cleaner cut the number of baths and rinses just in half. The quicker wetting and complete emulsifying action of Metso 66, special platers' cleaner, save time and expense. Economical, trouble-proof cleaning is worth looking into. Leading platers everywhere are asking for samples of Metso 66.

PHILADELPHIA QUARTZ CO.

General Offices: Ionic & 3rd Sts., Philadelphia
Chicago Sales Office: 205 W. Wacker Drive

METSO CLEANERS

1
PHILADELPHIA
PROCTOR
DAYTON
2
CINCINNATI
3
PROCTOR
New Haven
Presents
The Unusual

business during the coming year—if you can believe their record of space reservations for the 1939 National Metal Congress and Exposition. The five-day annual Congress will be held this year in Chicago beginning October 23.

William H. Eisenman, secretary of the American Society for Metals and managing director of the Congress, reports that space for this year's showings of metallurgical progress is 95 per cent reserved; this, with three months remaining before the show. This figure represents a 15 per cent increase in space contracted for 1939 as compared with last year's totals.

New York and vicinity and the Chicago area head the reservation list with 35, and 18 Ohio companies bring the Buckeye state to second place.

Other areas ranking in their order, as regards exhibitors, are New England. Pittsburgh, Philadelphia, Michigan, and Milwaukee respectively.

The National Metal Congress and Exposition is the annual trade show of the metal field. Manufacturers and fabricators of metals show latest developments at the exhibitions which attract thousands of industrial buyers.

A.E.S. EXHIBITS

These photographs illustrate the variety of plated products that were placed on exhibition at the recent convention of the American Electro-Platers' Society which was held at Asbury Park, New Jersey.

No. 1 is a display of rhodium plated reflectors presented by Baker & Company, Inc., Newark, N. J. No. 2 is a view of the plated parts that go into the manufacture of a National cash register. This exhibit was submitted by the Dayton Branch. No. 3 shows a portion of the plated Proctor Electric products, an exhibit which was submitted by the Philadelphia Branch. No. 4 is a view of the Cincinnati Branch exhibit showing a variety of small parts that were plated by the Cincinnati Plating & Repair Company and The Fox Company. No. 5 is the prize-winning branch exhibit presented by the New Haven, Conn., Branch.

Richard P. Brown Appointed Secretary of Commerce

Richard P. Brown, who was recently appointed by Governor Arthur H. James to be the first Secretary of the new Department of Commerce of the Commonwealth of Pennsylvania, is probably

Richard P. Brown

better known as the former President and now Chairman of the board of The Brown Instrument Company and Vice-President of the Minneapolis-Honeywell Regulator Company.

Mr. Brown has been interested for some years in the industrial development of Pennsylvania, with the objective of increasing the number of jobs in private industry and thereby reducing the relief load and in turn the taxes necessary to support those on relief.

The new Department of Commerce is not only to aid Pennsylvania's industries in their successful expansion and development, but it was also authorized by the Commerce Law to recommend future legislation to the Pennsylvania Legislature which can be of help to Pennsylvania industries.

Mr. Brown's past business training of thirty years devoted to the manufacture of measuring and controlling instruments for use in industry, should stand him in good stead in his new position as Secretary of Commerce of Pennsylvania.

NEW Plant equipment and MATERIALS

Enthone Baked Enamel Stripper

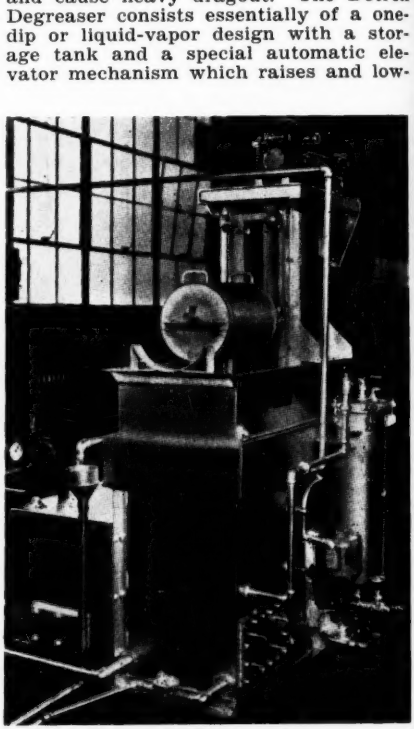
The Enthone Company, 442 Elm St., New Haven, Conn., has announced the development of Enthone Baked Enamel Stripper for rapidly removing high baked synthetic enamels from all types of base metals such as magnesium alloys, zinc base die castings, aluminum, steel, and molded plastic products. without etching or attacking them. It is claimed that these base metals, after stripping of the enamel, are left clean and bright without deposition of pigment or etching. The stripper is said to be non-caustic, is used diluted with water, and completely removes the enamel in from one to three minutes.

The manufacturer states that Enthone Baked Enamel Stripper has been in large scale industrial use for over a year and resulted in economy of material and labor savings due to elimination of hand wiping, wire brushing, and polishing which were necessary previously.

Detrex Degreaser with Rotating Baskets

A special 1-Dip Detrex Degreaser with rotating baskets was recently developed and placed on the market by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Michigan.

Outstanding economy in the cleaning of cup-shaped work is said to be made possible by the use of the rotating basket design of the new unit. This machine can be used on work which would otherwise tend to trap solvent and cause heavy dragout. The Detrex Degreaser consists essentially of a one-dip or liquid-vapor design with a storage tank and a special automatic elevator mechanism which raises and low-



Dip, rotating basket designed Detrex Degreaser, equipped with continuous filter and continuous Detrex solvent still. This view is from the loading-unloading station and shows the formed rest for quickly placing and centering basket of work on the driven spindle.

ers the rotating baskets. The continuous filter located at the side of the machine is used to keep the boiling chamber free of insoluble material, and a continuous operating Detrex solvent still is used to remove oil contamination. By this method, the work is always immersed into clean solvent, and a final pure vapor cleaning action is given as the work is raised out of the boiling solution.

A clean solvent storage tank is located at the rear side of the degreaser. An elevator drive mechanism, shown in the illustration herewith, can be seen on a platform above the structural work. The elevator drive is effected by a combination right angle geared head motor and brake which is complete with a reversing switch, vacuum tube time relay, limit switch, and push button station.

The electrical controls, water separator, and vapor trap are located on the end of the machine opposite the loading and unloading station. The boiling compartment has a removable cleanout door and drain valve and is equipped with a steam jacketed bottom and steam pressure relief valve.

The drum-shaped mesh basket with which this machine is equipped for rotating and draining the work fits over a spindle which is attached to the elevator mechanism and has a gear and pinion device to cause rotation of the baskets during its descending and ascending travel. A push button station located adjacent to the loading end operates the elevator drive mechanism, while limit switches and a time interval control govern the travel of the elevator and basket. After the set time interval for cleaning in the boiling solution, the load returns automatically to the loading and unloading stations.

The rotating basket design of the degreaser is manufactured in various sizes ranging in capacity up to two tons per hour to suit individual requirements. The unit shown herewith is 4 ft. in length, 4 ft. 8 in. in width, and 7 ft. 2 in. in height. The operating height to center line of the basket spindle is 4 ft. 8 inches. The rotating baskets are 12 in. in diameter by 15 in. long. The solvent capacity of the boiling chamber is 61 gallons, and the storage tank is of sufficient size to hold all of the solvent from the machine. The approximate weight of the unit is 1,600 lbs., not including accessory equipment and solvent still.

Seitz Universal Line Filter Type JG

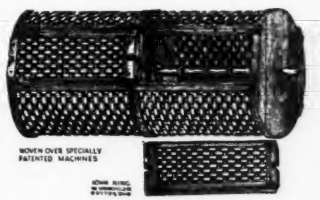
A small, all-purpose filter, to be known as the "Type JG," has been placed on the market by American Seitz Filter Corporation, Paterson, N. J. The overall dimensions of the filter are: height, 7¾ in.; diameter of base, 5½ in., which includes outlet, inlet and drain cock.

The Seitz Universal Line Filter Type JG is said to be adaptable to any filterable liquid or for straining viscous liquids.

This unit is designed with two inner cylindrical screens, having a ¾ in. space between them. This space is filled with the desired grade of loose asbestos, pulp, charcoal, or other filtering agent. It is solidly packed by means of a wooden cylinder which has the same diameter as the space between the screens. The inlet is through the inside of the inner cylindrical screen.

The liquid to be filtered is forced through the inner screen, then through the filtering material and the outer screen, and collects in the outside shell and then passes to the outlet. For liquids that require straining, no filter-

USE THEM ONCE — YOU'LL USE THEM ALWAYS

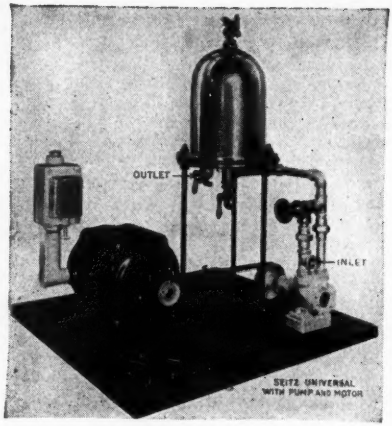


— KING —
PLATING BARRELS
PRODUCE
CLEANER - FASTER AND SMOOTHER PLATING

A wood woven cylinder adaptable to any barrel plating tank. The woven construction allows a complete interflow of solution. Barrel is not to rotate more than 2 R.P.M. as speed means wear—not plate. Made in all diameters and lengths. Prices are exceptionally low. There is no maintenance cost. *Write for illustrated folder.*

JOHN KING
48 SPRINGFIELD ST., DAYTON, OHIO

CHECK YOUR DOLLAR INVESTED

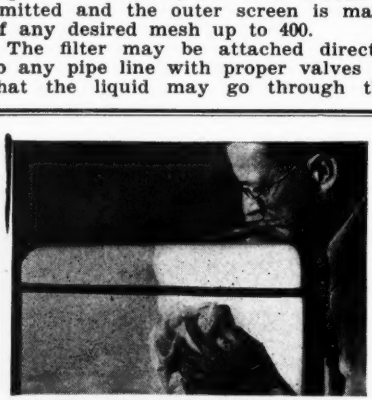


Seitz Universal Line Filter Type JG

ing media is used; the inner screen is omitted and the outer screen is made of any desired mesh up to 400.

The filter may be attached directly to any pipe line with proper valves so that the liquid may go through the filter or directly through the line. The filter is available with flat cast iron base, pump, motor, and by-pass arrangement for regulating pressures.

The standard construction is tinned bronze with Monel screening, but the materials may be varied according to requirements.



"MAGIC" TACK RAGS
IMPROVE YOUR FINISH 100%

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

Wm. A. Juergens Co.
4036-40 Lagrange Street,
Toledo, Ohio, U. S. A.
If your dealer does not carry Magic Tack Rags, write us for sample.

Beaverbright Burnishing Curd Soaps

Beaverbright Burnishing Curd Soaps marketed by H. Leroy Beaver, Lansdale, Pa., are especially applicable for barrel finishing fine work such as hotel silverware and fine plated products. These soaps are essentially combinations of hard tallow base materials and are combined with various alkalies and chemicals so that they constitute a highly developed and comprehensive line of soaps for barrel burnishing use.

There are four types of Beaverbright Burnishing Curd Soaps available:

Type A—A tallow base soda soap with carefully graduated and balanced alkaline proportions developing what is termed "short curd." Readily soluble, free rinsing and applicable to all classes of metal finishing. Contains a proper proportion of concentrated ammonia.

Type B—A tallow base, "sodate" soap with which is incorporated a special alkaline preparation with many and varied properties which make it especially advantageous for use with "hard water," thus eliminating the necessity for adding any chemical water softeners.

Type C—A tallow base, light soda ash alkaline curd soap noted for its very short grain. Goes into solution rapidly and provides maximum lubricating with detergent properties. Especially applicable on steel parts where sodium cyanide is used in combination with the soap.

Type D—This soap is somewhat similar to formula "A" except that the real soap proportions and the conversion alkalies are in greater proportion and with further additions of a balanced proportion of ammonium carbonate as well as "soapless soap" developed from the end distillate of fatty alcohols. The finest barrel burnishing soap ever compounded.

All Beaverbright Burnishing Curd Soaps are prepared from base material supplied by The Procter & Gamble Company and the various formulas were developed with the co-operation of chemists of that company. All of the soaps are approximately 42 titre and are said to function best in water of at least 104 degrees Fahrenheit.

Ebonox

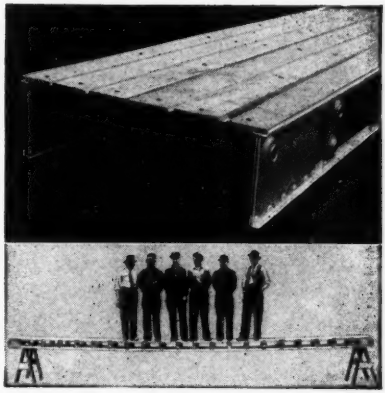
A new Pemco black oxide, to be known as "Ebonox," has been placed on the market by the Porcelain Enamel & Manufacturing Co., Eastern and Pemco Aves., Baltimore, Maryland.

Aluminum Platform

An aluminum platform, made in various lengths from 8 ft. to 25 ft. and widths from 12 in. to 24 in., has been placed on the market by the Aluminum Ladder Co., 147 Adams St., Tarentum, Pennsylvania.

Aluminum platforms are said to be ideal for bridging around tanks, and places where it is necessary to support men working off ground level. The 25 ft. platform illustrated in the cut herewith is supporting a load of 1,055 pounds. Aluminum platforms are said to remain strong after years of service since they do not rust or deteriorate.

All parts of the platform are completely bolted and riveted together, including the wood covering. Because there are no nails to work out, there is no danger of men tripping and falling while using the platform.



Aluminum Platform

Did You Know That---

—One Chicago manufacturer reduced the cost of finishing miscellaneous metal products in 10 ways by the installation of improved equipment? See page 12.

—The specification checking of thickness of plate on bathroom hardware items can be made an integral part of the plating cycle? See page 22.

—Finishing department executives who keep "up-to-date" on their industry read PRODUCTS FINISHING from cover to cover?

—A staff of consultants is ready to aid you in the solution of your finishing problems? See page 43.

—There are 21 companies this month who are offering to send you their literature on practically every phase of metal finishing? See page 62.

Autovent Fans Coated with Heresite

The Autovent Fan & Blower Company, 1805 N. Kostner Ave., Chicago, Ill., has announced a new treatment on

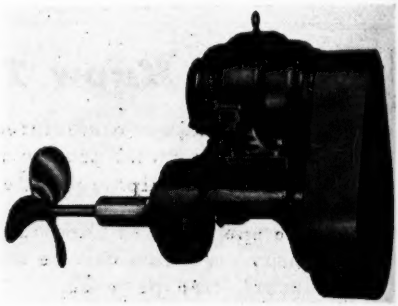
Autovent Fans Coated with Heresite

its acid-moisture proof and vapor-explosion proof propeller fans that is said to provide protection against corrosion and explosion. The chemical coating is known as Heresite and is especially recommended for use on fan wheels where extremely corrosive and highly concentrated acid or gas fume conditions prevail. The fan wheels are given multiple coats of Heresite baked finish at a temperature of 375 deg. F. Extensive tests by the company prove that this patented treatment keeps severest acid and practically all metal corroding substances from destroying the metal to which it is applied. Where acid-moisture proof fans are required, Heresite coated fan wheels are of heavy gauge steel, powered by fully enclosed round body motors that provide positive winding protection against all fumes and moisture.

For installations where acid and fume conditions are less severe, the fan wheels are treated with three coats of Bakelite lacquer. The vapor-explosion proof units have fan wheels of copper, brass, or other non-ferrous metals and motors bearing Underwriters' Label, Class 1, Group D rating. Non-ferrous fan wheels used on vapor-explosion proof fans can also be treated with Heresite where severe corrosive fumes are handled. Special construction features of motor meet the specifications approved by the National Board of Fire Underwriters'. Autovent centripetal fan wheel construction, no churning of air and non-overloading power characteristic are feature attractions of these units just as in the "Complete Line" of ventilating products.

"Lightnin" Side Entering Vee-Belt Mixer

The illustration herewith shows a view of the "Lightnin" Side Entering Vee-Belt Mixer which was developed and placed on the market recently by the Mixing Equipment Company, Inc., 1087 Garson Ave., Rochester, N. Y. In the "Lightnin" model, the motor is mounted on a pivoted steel platform,



"Lightnin" Side Entering Vee-Belt Mixer

actuated by a riser bolt, thus permitting maximum adjustment for belt ten-

Oriental Rouge is the ideal rouge for obtaining a mirror-like finish on stainless steel, silver, gold and all other metals. Write for details

Oriental Rouge Co., Inc.
Established 1901
66 Pine St. • Bridgeport, Conn.

sion or replacement of sealed outboard bearing.

Operating conveniences include cartridge type rear bearings which permit easy inspection and maintenance. The support bracket acts as a shield and protection to the bearing members. This type of mixer is said to have opened up a new field by making available larger tanks for mixing purposes. At present, combinations of two or more "Lightnin" Side Entering Mixers are said to provide the possibility for agitating the contents of tanks holding 5,000,000 or more gallons of thin fluids. This type of mixer is said to be particularly adaptable for use on small tanks where head room is not available or where the top of the tank must be kept free.

The "Lightnin" Vee-Belt Mixer is recommended where quietness of a Vee-Belt drive is desired or where interchangeability of motor is important. This type of drive is said to be ideal for mixing operations in the main line of production, and also when stand-by equipment is not available. Where desired, silent chain drive can be substituted for the Vee-Belt drive.

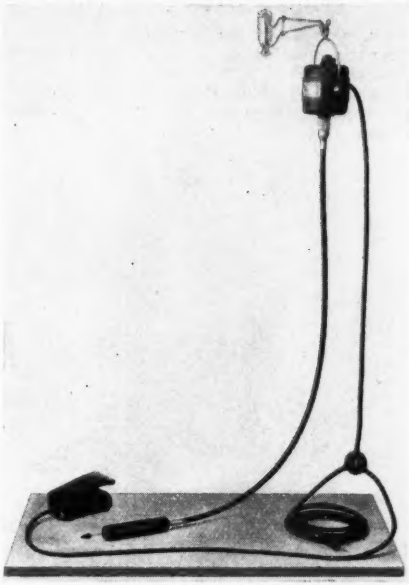
Rustbuster Water Treating Material

A water treating material to be known as "Rustbuster" for dissolving scale and rust in recirculating systems has been placed on the market by Cannon Chemical Co., 210 Broadway, Everett, Mass. Rustbuster is a liquid material developed for adding to recirculating and cooling systems to dissolve rust and scale, to emulsify any oil film, and to protect metal surfaces against further corrosion.

Rustbuster is suitable for application in industrial heating systems and in connection with operation of air conditioning equipment. This material is added to the water of the system in the proportion of one per cent by volume.

Redcap Flexible Shaft Grinder

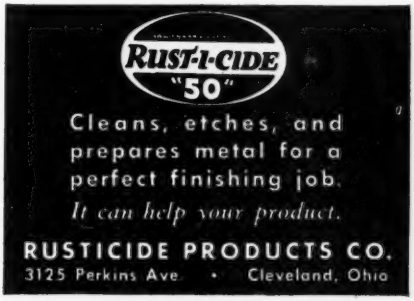
A flexible shaft grinder, to be known as the "Redcap," has been placed on the market by Walls Sales Corporation, 96 Warren St., New York, N. Y. The Redcap unit is equipped with a $\frac{1}{6}$ h.p. universal type motor, finished in black crinkle and complete with rubber covered cord and plug.



Redcap Flexible Shaft Grinder

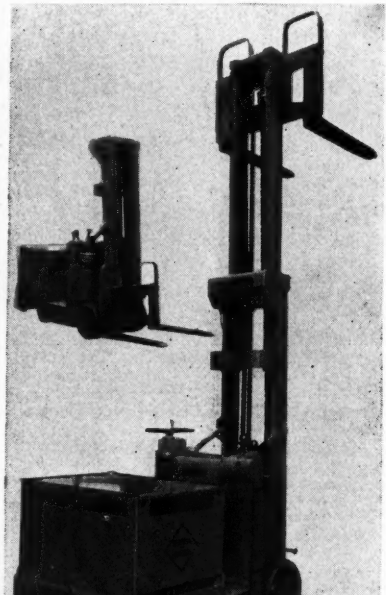
A variable speed foot rheostat is standard equipment with the Redcap Flexible Shaft Grinder. The flexible shaft is 37 in. long from motor to handpiece.

The Redcap ball bearing handpiece is available with No. 0 balanced Jacob chuck and one No. 52 mounted wheel point. The maximum speed of the handpiece is 12,500 r.p.m. The net weight with rheostat is 8 lbs. and the shipping weight is 11 pounds. Without the rheostat, the unit weighs 6 lbs. and the shipping weight is 9 pounds.



Elwell-Parker F-16 Truck

A compactly built model truck of the center control fork type, to be known as the "F-16," has been placed on the market by The Elwell-Parker Electric Company, 4000 St. Clair Ave., Cleveland, Ohio. This truck is rated at 6,000 lbs. and is built either as a telescoping or non-telescoping truck for inside car work or high tiering. It may be fitted with a fork of two prongs to be thrust beneath metal or wood load carrying pallets or with a single or double ram for inserting in coils or circular ring type packages or unit loads. The forks and rams are made of various lengths and spacings to accommodate various loads.



Elwell-Parker F-16 Truck

The operator's station affords him unobstructed vision of the fork tips when the load is being picked up or placed and is said to contribute more to his safety without increasing the turning radius as when similarly adequate protection is provided by a structure behind the operator at the rear of the truck.

The frame of the F-16 model is a box-like formed plate of all-welded structure with fixed full floating axle and non-steered wheels fitted with solid rubber tires.

Enclosed drive motor is mounted on an axle driving through spiral and spur gears on anti-friction bearings. A new type of trail or rear axle carries the frame on a spring system which provides for a third point support which assures floor contact not only for the two trail wheels but for the two drive wheels ahead and simultaneously provides support against strains.

The fork hoist is fitted with slip clutch for protection against excessive overloads or accidental thrust of load forks under immovable loads while an overrun ratchet device protects the hoist and chains if the load forks are lowered against obstruction. The truck may be fitted with interchangeable lead or alkaline battery, or gas-electric unit as the power source.

Plating Solution Filter Press Paper

The Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating equipment and supplies, has recently placed on the market a newly developed plating solution filter press paper. At present, the papers are furnished in reams of 500 sheets, 12½ in. x 12½ in. square to fit a 12 in. x 12 in. Sperry Press. Two holes are machine cut in opposite corners of the paper to line up with holes in the plates and frames. Other sizes can be furnished according to specifications.

To use the papers, they are placed

For a real good polishing job use
KEYSTONE EMERY
TURKISH — NAXOS — AMERICAN
KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

over the cloths when assembling the press, making certain that the flow of solution is through the paper. The paper is said to catch all the suspended matter being filtered from the solution. When it is necessary to clean a press, it can be opened and the papers with the collected sludge removed and discarded. By the use of the filter paper, it is said to be seldom necessary to remove the cloths from the press.

The Hanson - Van Winkle - Munning Company filter press paper is said to have nearly as high a wet breaking strength as the dry breaking strength. Since the paper is only 0.003 in. thick, it does not hold the plates away from the frames in the press. Good contact is maintained and the solution does not leak from the press.

Ipco Fog-gle Cloth

A cloth which is said to clean, polish, and retard fogging, to be known as the "Ipco Fog-gle Cloth," has been placed on the market by Industrial Products Company, 741 W. Somerset St., Philadelphia, Pennsylvania.

The principle of fog-gle cloth is to prevent lenses from banking with condensation and thus impair vision. This is said to be accomplished by a non-toxic wetting out agent which reduces surface tension on the glass.

The Ipco Fog-gle Cloth is easy to use, inasmuch as it is only necessary to wipe both sides of the glass surface. It is practical in that it is always ready for use and may be carried inside the goggle case.

The Ipco Fog-gle Cloth is said to be serviceable over a long period of time. It is available packed in a transparent envelope with full directions printed on the envelope.

Hommel Sweatband

The O. Hommel Company, 209 Fourth Ave., Pittsburgh, Pa., has recently placed on the market a new, cool, and comfortable sweatband for factory workers. This sweatband is manufactured from a special cellulose material and is said to absorb about 20 times its weight in water.

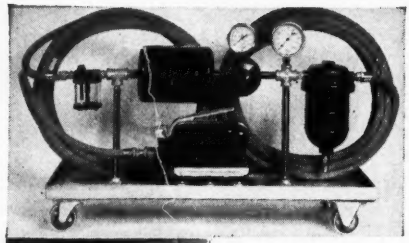
Hommel Sweatband

Before using, the sweatband should be immersed in water and hand squeezed. It is said to be easily washed out with soap and water as frequently as desired. According to the manufacturer, plant workers particularly find this type of band convenient because it prevents perspiration from running into their eyes and also into ingredients that may be harmed by perspiration.

Portable Unit for Sterling Speed-Bloc Sanders

Users of Sterling Speed-Bloc Sanders will be interested to learn that Sterling Products Company, 2457 Woodward Ave., Detroit, Mich., has recently announced the portable unit illustrated herewith. The unit includes the tray mounted on castors and the uprights and fittings which, together with the sander, provide a convenient, portable

Increase Production
Varied shapes and sizes more uniformly Finished
SEND SAMPLE TIME STUDY GLADLY GIVEN.
Packer-Matic Automatic
Polishing & Buffing Machines
Cut Hour Costs
Automatically — today's Method of Finishing
THE PACKER MACHINE CO.
MERIDEN, CONN.



Portable Unit for Sterling Speed-Bloc Sanders

outfit for use any place in the shop.

Space is provided in the tray for small tools, wiping cloths, and abrasive paper to save time on the part of the operator. The arrangement of the unit brings the air controls within easy reach regardless of where the work is being done in the shop.

The manufacturer is also marketing a unit which can be mounted on the wall or ceiling in a fixed position, where such an arrangement is more desirable.

U. S. Super Royal Cord Air Hose

A newly designed U. S. Super Royal Cord Air Hose, to meet severe service demands, was placed on the market recently by United States Rubber Company, Mechanical Goods Division, 1790 Broadway, New York, N. Y. The hose is highly recommended for hot solution conditions and, according to the manufacturer, is actually a new hose in appearance and also in constructional features.

A special feature of the hose as redesigned employs the use of a high grade synthetic rubber tube. Another change of importance is the incorporation of a tan gum cover and an exclusive method of bonding both the cover and tube to the hose body. The body, of cord tire construction, is said to have more than ample pressure resistance and maximum flexibility.

METALPREP

"Used First — Makes Your Paint Finish Last"

- Removes Rust
- Etches Metal
- Makes Paint Adhere

The complete metal cleaner for all sheet metal surfaces. Eliminates paint failures due to rust, grease and improper cleaning. Increases the life of the finish.

Write for Literature

NEILSON CHEMICAL CO.

6564 BENSON ST. DETROIT, MICH.

Willson Respirator No. 770

A mechanical-filter respirator for protection against fumes, to be known as the "Willson Respirator No. 770," has been placed on the market by Willson Products, Inc., 271 Thorn St., Reading, Pa. This respirator is designed for protection against fumes such as lead, arsenic, copper, chromium, cadmium, and zinc resulting from sublimation or the condensation of their vapor, or from chemical reactions between their vapors and gases.

Willson Respirator No. 770

The rubber face mask of the Willson Respirator No. 770 fits snugly under the chin and an air-tight contact is obtained with only a slight amount of tension on the adjustable double elastic headband. Exhalation of used air through a properly placed exhaust valve is aided by twin inhalation valves in

the mask interior. The filters of the unit may be readily cleaned. All parts are replaceable.

Commercial Solvents Lacquer Application Technique

A recent development of Commercial Solvents Corporation, Terre Haute, Ind., reveals a new lacquer technique based on the fact that by a novel method of lacquer formulation and application, worked out in the Commercial Solvents laboratories, it is possible to apply a lacquer containing a large proportion of solid ingredients at elevated temperatures of 150 to 160 deg. F. The flow and other characteristics of lacquer so formulated and applied are said to be equal to those of lacquers applied in the usual manner. Blushing troubles are said to be reduced to a minimum.

Although the high-solids lacquers require new and different methods of formulation, they do not require any unusual ingredients. The highest solids content and optimum flow for smoothness are obtained with butyl acetate and Butanol. According to the manufacturer, the solids content of a lacquer can be increased by 50 per cent or more and these high-solids lacquers can be applied in thick liquid coats and therefore the number of coats required to give any desired thickness of film may be reduced by as much as one-half. Very attractive one-coat finishes have been obtained by the use of the new technique.

Amco Galvanizing Powder

American Solder & Flux Company, Wayne Ave. and Berkley St., Philadelphia, Pa., has recently placed on the market a metal protecting coating to be known as "Amco Galvanizing Powder."

Amco Galvanizing Powder is said to produce a protective surface that is equal in corrosion resistance to that produced by the hot dip process. It can be used to replace the protective surface of metal products and equipment which has been removed or damaged during assembly operations such as welding, forming, banding, riveting, threading, and so on.

In use, Amco Galvanizing Powder is applied to the metal surface either dry or in paste form and then heated. The powder is extremely active as a flux and is said to penetrate the oxide film usually found on metal surfaces. No preliminary cleaning or acid pickling is necessary except where gas welding has formed a highly oxidized surface, in which case the oxide must be completely removed.

Sarco Water Cooling Control

Sarco Company, Inc., 183 Madison Ave., New York, N. Y., manufacturers of steam specialties, has recently announced the addition to their line of temperature regulators of a cooling water control, to be known as the "Type TR-40." The TR-40 Regulator is designed for use on the cooling water jackets of degreasers such as are used in metal-cleaning departments.

Sarco Type TR-40 Cooling Water Control

The control consists of a piston valve operated by a liquid expansion thermostat to throttle the flow of controlling water as required to maintain a constant temperature. The valve is provided with a bleeder port adjustable from the outside. This serves to allow a small amount of cooling water to flow at all times, even when the valve is closed. This feature is also said to keep the thermostat active and ready to respond.

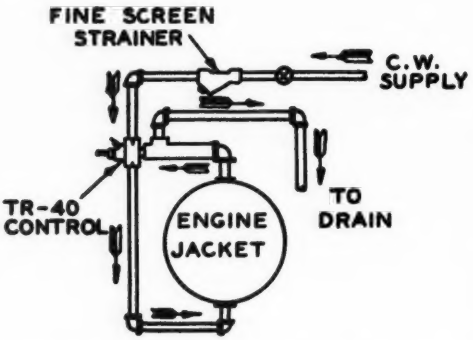
Lupomatic

Here is a *completely automatic* process for finishing all metals to a high grade lustre *at a saving of from 60% to 92%.*

Let us demonstrate *this money saving process to you gratis.*

Lupomatic Tumbling Mach. Co., Inc.
4511 Bullard Ave. New York, N. Y.

An important innovation is a safety device in the form of a fusible plug inserted between the thermostat plunger and the valve spindle in such a way that in the event of thermostat failure, the plug will collapse and the water valve will be forced wide open. This is said to prevent damage to the unit to which it is applied in the event of thermostat failure. The Type TR-40 Cooling Water Control is available in ⅜ in. to 1 in. sizes.



Installation Diagram of Sarco Type TR-40 Cooling Water Control

Check In AT DE WITT OPERATED HOTELS
In Cleveland
HOTEL HOLLENDEN
In Columbus
THE NEIL HOUSE
In Akron
THE MAYFLOWER
In Jamestown, N. Y.
THE SAMUELS
and
THE JAMESTOWN
In Corning, N. Y.
BARON STEUBEN HOTEL
DeWITT OPERATED HOTELS
Theo. DeWitt, Pres. R. F. Marsh, Vice Pres.

Metallic Lead Paint Protects Metals

Lead has long been used for protective purposes in various forms, as for instance white lead and red lead. The uses of lead as protective films are equally recognized, as for example lead burning and terne plating. With these applications in mind, the C. H. Dragert Co., Inc., 235 India St., Brooklyn, N. Y., has developed a product called "Chromlead," which consists of a metallic lead paste as the pigment and chromized oil as the vehicle. The Chromlead paste is a flaked lead, leafed in chromized oil.

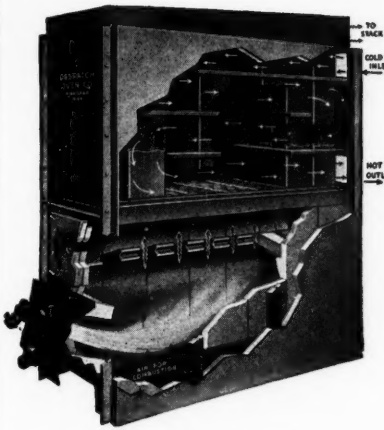
The vehicle is said to be unique in that it carries chromium-chromate in solution, and contains no soap and is not an emulsion. The product is claimed to present an excellent anti-corrosive film on any of the ferrous or non-ferrous metals. This protection comes from both the leafing of the lead and also a measure of surface dehydration.

The paint will contract and expand with the metallic surface, may be secured for air-dry or baking, and dries dust-free in 30 minutes. Colored finishes may be applied over the Chromlead, and the material covers about 200 to 400 sq. ft. per gallon. It is used on partitions, switch boxes, cabinets, tool boxes, ventilating systems, chemical machinery and equipment, steel sash, and so on.

Despatch Indirect Air Heater

A gas and oil heated heater, to be known as the "New Despatch Indirect Air Heater," has been placed on the market by Despatch Oven Company, 622 Ninth St., S. E., Minneapolis, Minn. The Despatch Indirect Air Heater incorporates many new features that are said to practically eliminate the maintenance and replacement of parts.

One feature is the new arrangement of the heat exchanger. The heat ex-



Despatch Indirect Air Heater

changer is arranged with a heavy duty alloy cast protecting plate that shields the tubes in the heat exchanger from the radiant heat in the combustion chamber. This added protection feature in Despatch Indirect Air Heaters is said to assist in preventing burned out tubes.

The heat exchanger consists of 88 individual tubes which increase the normal area for radiation. The tubes are staggered to produce the greatest possible action of the air as it passes through the heat exchanger. The resistance to air passage through the exchanger is said to be very low.

Another feature is that only one burner is required to obtain the 500,000 B.T.U. rating of the unit. The burner equipment used is a low pressure proportioning type which keeps a constant ratio between the air and the fuel being used, whether gas or oil. The proportioning is said to produce high efficiency of operation and eliminates soot and dirt which reduce maintenance and cleaning of the heat exchanger tubes to an absolute minimum.

Another feature of the Despatch heat exchanger is the arrangement of the combustion chamber so that there is no flame impingement on metal parts.

Nickel Alloy Developments. A six-page folder now being issued by The International Nickel Company, Inc., 67 Wall St., New York City, contains basic information on mechanical, corrosion-resistant and other properties of rolled nickel, Monel, and other high nickel alloys produced by The International Nickel Company, Inc. A great amount of technical information contained in this folder will be of interest to those engaged in the process industries. Copy free upon request.

Mention PRODUCTS FINISHING when writing to advertisers.

Opportunity Section

THIS Opportunity Section is available for classified advertisements featuring equipment, employment, business opportunities, etc., in the industries devoted to the cleaning, plating, polishing and finishing of metals. For advertising rates and other information address:

PRODUCTS FINISHING
431 Main Street • Cincinnati, Ohio

FOR SALE
Guaranteed DeVilbiss Reconditioned Guns
Booths—Fans—Transformers
DeVilbiss Distributors

Hovey Spray Equipment Co.
1509 Spring Garden St. Philadelphia, Pa.

for your CATALOG *library*

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Platers' Solvent Cleaner
Information regarding Enthone Platers' Solvent Cleaner, a cleaning material which is said to possess remarkable cleaning action due to its great penetrating and wetting power, is contained in a folder which is now being issued by The Enthone Co., 444 Elm St., New Haven, Connecticut.

2. Spraco Painting and Industrial Finishing Equipment
A well illustrated 30-page catalog containing information on Spraco spray painting and industrial finishing equipment which will be of interest to all finishing executives. Spray Engineering Company, 120 Central St., Somerville, Massachusetts.

3. Serving Industry
A 36-page catalog containing valuable information on industrial lubrication and cleaning now being issued by Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.

4. Plating and Polishing Equipment
One of the most complete catalogs describing and illustrating plating and polishing equipment is now being issued by Munning & Munning, Inc., 202 Emmett St., Newark, New Jersey.

5. Fire Extinguishing Equipment
A two-color 8-page catalog describing the latest development in fire extinguishing equipment for finishing departments is now being issued by Walter Kidde & Company, Inc., 731 West St., Bloomfield, New Jersey.

6. Semi-Automatic Polishing and Buffing Equipment
A beautifully illustrated 8-page bulletin describing semi-automatic polishing and buffing equipment, composition applicators, and so on is now being issued by Continental Roll & Steel Foundry Company, Railroad Ave., East Chicago, Ind.

7. Improved Air Cleaning for Industry
A beautifully illustrated catalog describing the Centri-Merge Method of cleaning air is now being issued by Schmieg Sheet Metal Works, 314 Piquette Ave., Detroit, Michigan.

8. Retarder for Lacquer Blushing
Complete information regarding Enthone Retarder for preventing blushing of nitrocellulose lacquers now being issued by The Enthone Co., 442 Elm St., New Haven, Connecticut.

9. Miccro Supreme Stop-Off Lacquers
A 4-page folder describing stop-off lacquers for insulating plating racks used in decorative plating and for masking parts to be hard chromium plated now being issued by Michigan Chrome Company, 6342 E. Jefferson Ave., Detroit, Michigan.

10. Aluminum Oxide Abrasive Grain
A 4-page catalog describing "Borolon," an aluminum oxide abrasive grain for the polishing trade and general industrial use. Abrasive Company, Tacony and Fraley Sts., Philadelphia, Pa.

---

11. Woven Wood Plating Barrel
Folder describing many features of the King woven wood plating barrel. John King, 48 Springfield St., Dayton, Ohio.

---

12. Airway Ventilated Buffs
Cool cutting buffs for high speed buffing operations are illustrated and described in a 4-page folder now being distributed by Jackson Buff Corporation, 21-03 41st Ave., Long Island City, New York.

---

13. Ross Metal Decorating Oven
A complete description of the equipment for baking decorative coatings on metal is now being issued by J. O. Ross Engineering Corporation, 350 Madison Ave., New York City.

---

14. Dust Collecting Systems
An attractive 24-page catalog has just been issued by The Kirk & Blum Mfg. Co., 2816 Spring Grove Ave., Cincinnati, Ohio, which illustrates and describes many K. & B. Dust Collecting Applications installed in numerous industries.

---

15. Hovey Spray Equipment
A 4-page catalog describing and illustrating Hovey Spray painting guns and painting outfits is now being issued by Hovey Spray Equipment Co., 1509 Spring Garden St., Philadelphia, Pa.

16. Bonderizing
The Parker Process that holds paint to steel and resists rust, known as "Bonderizing" is described in this catalog now being issued by Parker Rust Proof Company, 2172 E. Milwaukee Ave., Detroit, Michigan.

---

17. Control Your Electroplating Process
A method of determining pH by means of Taylor slide comparators is explained in simple terms in a catalog now being issued by W. A. Taylor & Company, Inc., 872 Linden Ave., Baltimore, Md.

---

18. Metal Cleaning Hints
An interesting bulletin giving details on Metalprep Rust and Grease Remover. Tells how Metalprep makes metals safe for paint. Neilson Chemical Co., 6564 Benson St., Detroit, Michigan.

---

19. Spray Paint and Finishing Equipment
A most complete catalog describing and illustrating spray painting and finishing equipment manufactured by Binks Manufacturing Company, 3114-40 Carroll Ave., Chicago, Illinois.

---

20. Protective and Decorative Finishes
Hilo Varnish Corporation, 42-60 Stewart Ave., Brooklyn, N. Y., presents Bulletin No. 15 titled, "The Five Hilo Rip-pls."

---

21. Economical Degreasing
A series of leaflets covering practically every phase of metal degreasing are now being published by Detroit Rex Products Co., 13017 Hillview Ave., Detroit, Michigan.

Print plainly in filling out coupon for literature.

PRODUCTS FINISHING
431 Main St., Cincinnati, Ohio

I am interested in receiving the following literature reviewed in your August issue.

No...... **No.**..... **No.**..... **No.**..... **No.**.....
(Insert numbers denoting literature you want.)

Company .....

Name ..... Title.....

Company Address .....

City ..... State.....

INDEX *to advertisements*

Abrasive Company 45
Abrasive Products, Inc..... 2
American Air Filter Co., Inc..... 5
American Chemical Paint Company..... 39
Continental Roll & Steel Foundry Co..... 29
Despatch Oven Company..... 17
Detroit Rex Products Co..... 31
DeWitt Hotels, Inc..... 60
Egyptian Lacquer Mfg. Co..... 6
General Abrasive Company, Inc..... 38
Hamilton Emery & Corundum Co., The..... 40
Hovey Spray Equipment Co..... 61
Jackson Buff Corporation.....32-33
Juergens Co., Wm. A..... 52
Keystone Emery Mills..... 56
King, John 51
Kirk & Blum Mfg. Co., The.....Fourth Cover
Lupomatic Tumbling Machine Co..... 59
Mahon Company, The R. C..... 13
Michigan Chrome Company..... 21
Miller Rubber Company..... 15
Neilson Chemical Co..... 58
Oakite Products, Inc..... 1
Oriental Rouge Co., Inc..... 54
Packer Machine Co., The..... 57
Parker Rust Proof Company..... 3
Philadelphia Quartz Co..... 47
Pulmosan Safety Equipment Corp..... 23
Ross Engineering Corp., J. O.....Third Cover
Roxalin Flexible Lacquer Co., Inc.....Second Cover
Rusticide Products Co..... 55
Spray Engineering Co. 25
Stanley Chemical Co., The..... 8
Udylite Corporation, The..... 41
Varnish Products Co., The..... 35
Walker Co., H. V..... 27
Watson-Standard Co., The..... 4

PRODUCTS FINISHING
PUBLISHED BY GARDNER PUBLICATIONS, INC.
431 MAIN STREET • CINCINNATI • OHIO